PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN VOLTAGE REGULATORS, COMPONENTS THEREOF AND PRODUCTS CONTAINING SAME**	**Inv. No. 337-TA-564**

COMMISSION OPINION

On September 24, 2007, the Commission issued notice that it had determined (1) that there was a violation of section 337 of the Tariff Act of 1930, 19 U.S.C. § 1337, in the above-captioned investigation as to asserted claims 2, 3, and 34 of United States Patent No. 6,580,258, (2) that a limited exclusion order is the appropriate remedy for such violation, (3) that the remedy shall not extend to downstream products that contain the infringing articles, (4) that consideration of the public interest factors set out in 19 U.S.C. § 1337(d) does not preclude issuance of that remedy, and (5) that the amount of bond to permit entry during the Presidential review period should be set at 100 percent of the entered value of the involved articles. This opinion sets forth the reasons for the Commission's determinations.

I. BACKGROUND

The Commission instituted this section 337 investigation on March 22, 2006, based on a complaint filed by Linear Technology Corporation of Milpitas, California ("Linear"). 71 *Fed. Reg.* 14545 (March 22, 2006). The complaint alleged violations of section 337 of the Tariff Act of 1930, 19 U.S.C. § 1337, in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain voltage regulators, components

thereof and products containing the same by reason of infringement of claims 1-14 and 23-35 of United States Patent No. 6,411,531 ("the '531 patent"), and claims 1-19, 31, 34, and 35 of United States Patent No. 6,580,258 ("the '258 patent"). The complaint further alleged that an industry in the United States exists as required by subsection (a)(2) of section 337. The complaint and notice of investigation named Advanced Analogic Technologies, Inc. of Sunnyvale, California ("AATI") as the sole respondent. The investigation was assigned to administrative law judge ("ALJ") Sidney Harris, who conducted an evidentiary hearing from December 4 to December 15, 2006. Only claims 2, 3, 34, and 35 of the '258 patent and claims 4, 9, and 26 of the '531 patent remained at issue in the investigation when the ALJ issued his final initial determination.

On May 22, 2007, the ALJ issued his final initial determination ("ID") finding no violation of section 337. Specifically, the ALJ determined that none of respondent AATI's accused products directly infringe the asserted claims of the '258 patent, either literally or under the doctrine of equivalents, and that only its AAT3119 product directly infringes claims 4 and 26 of the '531 patent. He found that no indirect infringement had occurred in connection with any of the asserted claims of either patent. As to validity, the ALJ determined that claim 35 of the '258 patent and claims 4, 9, and 26 of the '531 patent are invalid due to anticipation, rejecting other arguments of invalidity. He also rejected arguments of unenforceability for inequitable conduct and estoppel. The ALJ determined that a domestic industry exists that practices the '258 patent, but that there was no domestic industry that practices the '531 patent, because of a failure to meet the technical prong of the domestic industry requirement.

On May 30, 2007, the ALJ issued his recommended determination on remedy and

bonding. The ALJ recommended that if a violation of section 337 is found with respect to one or both patents, a limited exclusion order should be issued which includes all accused devices and any downstream products manufactured by AATI, as well as cell phones manufactured by third parties that contain the accused devices. The ALJ also recommended that the amount of bond to permit temporary importation during the Presidential review period be set at 100% of the customs entered value of the infringing devices.

On June 4, 2007, all parties filed petitions for review of the final ID. On June 11, 2007, all parties filed responses to the petitions for review.

On July 24, 2007, the Commission determined to review the ID in part. 72 *Fed. Reg.* 41774-75 (July 24, 2007). Specifically, the Commission determined to review claim construction, infringement, and validity of the '258 patent, but not to review the remainder of the ID as to the '258 patent. With respect to the '531 patent, the Commission determined to review the ID concerning the issue of whether asserted claim 9 of the '531 patent is invalid for anticipation by the Kase reference, and upon review, to take no position as to that issue. The Commission determined not to review the remainder of the ID as to the '531 patent.

The Commission requested the parties to submit briefing on the issues on review. In connection with that review, the Commission stated that it was particularly interested in responses to the following questions:

1. With respect to claim 35 of the '258 patent, whether monitoring a voltage threshold in the accused products can be considered an equivalent to "monitoring the current" using a "current threshold" in assessing the infringement of claim 35 under the doctrine of equivalents? (parties should discuss the "function, way, result" test in their analysis.)

2. With respect to the '258 patent, provide an analysis of indirect infringement under §§ 271(b) and (c), including an analysis of any evidence upon which you rely.

Further, the Commission requested written submissions relating to the appropriate remedy, the public interest, and the amount of bond to permit importation during the Presidential review period.

On August 7 and August 14, 2007, Linear, AATI, and the Commission investigative attorney ("IA") filed briefs and reply briefs, respectively, on the issues on review and on remedy, public interest, and bonding. On August 7 and August 14, 2007, third parties LG Electronics Inc., LG Electronics U.S.A., Inc., and LG Electronics MobileComm U.S.A., Inc. (collectively, "LG"), filed a brief and reply brief, respectively, on the appropriate scope of any remedy.

II. TECHNOLOGY AT ISSUE

The imported products and asserted patents involved in the investigation concern electronic devices called voltage regulators. The purpose of a voltage regulator or a voltage regulator circuit is to provide a predetermined output voltage to a load, such as a notebook computer or cell phone, from an unregulated (*i.e.*, fluctuating) voltage source. For instance, a voltage source (*e.g.*, a battery) may supply power at raw input voltage levels that may be unusable by a device or load because the raw input voltage fluctuates to levels that are either too high or too low. Further, changes in the power demanded by the load can cause voltage fluctuations in the voltage source as it tries to compensate for such changing power demands (*e.g.*, a notebook computer demands more power when its hard drive is activated). Absent a voltage regulator circuit, the voltage fluctuations in the voltage source can result in situations similar to a momentary dimming of lights in the home when an appliance (such as an air

conditioner) turns on.

VOLTAGE SOURCE >>>>> VOLTAGE REGULATOR >>>>> LOAD (*e.g.*, notebook computer)
(*e.g.*, a battery) CIRCUIT

As shown above, a voltage source (*e.g.*, a battery) supplies power to the voltage regulator circuit and then to a load. As the voltage regulator circuit transfers power from the voltage source to the load, it also consumes significant power itself to perform its regulating function. The more power consumed by the voltage regulator circuit, the less there is available to the load. It is therefore desirable to reduce the power consumed by the voltage regulator circuit under certain conditions, thereby increasing the power available to the load. Additionally, reducing the power consumed by the voltage regulator circuit has the benefit of prolonging battery life, where a battery is the voltage source.

The imported products are electronic devices that regulate voltage and are grouped in two categories: (1) devices called voltage regulators which are accused of infringing certain claims of the '258 patent, and (2) devices called charge pumps which are accused of infringing certain claims of the '531 patent. Charge pumps are a type of voltage regulator known as a "boost voltage regulator," and by definition are voltage regulators that provide a load with an output voltage that is higher than the input voltage to the regulator circuit. We have previously determined that there is no violation of section 337 with respect to the '531 patent and it will not be discussed further here.

The '258 Patent

The '258 patent, entitled "Control Circuit And Method For Maintaining High Efficiency Over Broad Current Ranges In A Switching Regulator Circuit," issued on June 17, 2003, naming Milton E. Wilcox and Randy G. Flatness as inventors and Linear as assignee. JX-3 ('258 patent). The '258 patent relates to a type of voltage regulator called a switching regulator, which provides improvements in efficiency and reduced power dissipation in a voltage regulator circuit. In a switching voltage regulator, voltage at the output node is regulated by controlling transmission of power by using a power switch having a duty cycle (*i.e.*, ratio of ON/OFF time). Two major types of switching regulators are "asynchronous" switching voltage regulators (which use a transistor and a diode as the power switch) and "synchronous" switching voltage regulators (which use two transistors as the power switch). Synchronous switching voltage regulators provide an advantage over asynchronous switching voltage regulators in that they use the power that drives the voltage regulator circuit more efficiently. The '258 patent is directed toward a synchronous switching voltage regulator which regulates voltage by controlling the duty cycle of two transistors (*e.g.*, transistors 16 and 17 in Fig. 2 of the '258 patent) which make up the power switch (15 in Fig. 2 of the '258 patent). Figure 2 of the '258 patent is illustrative of the claimed

invention, and is reproduced below.

There are two groups of asserted claims in the '258 patent, the "sleep mode" claims

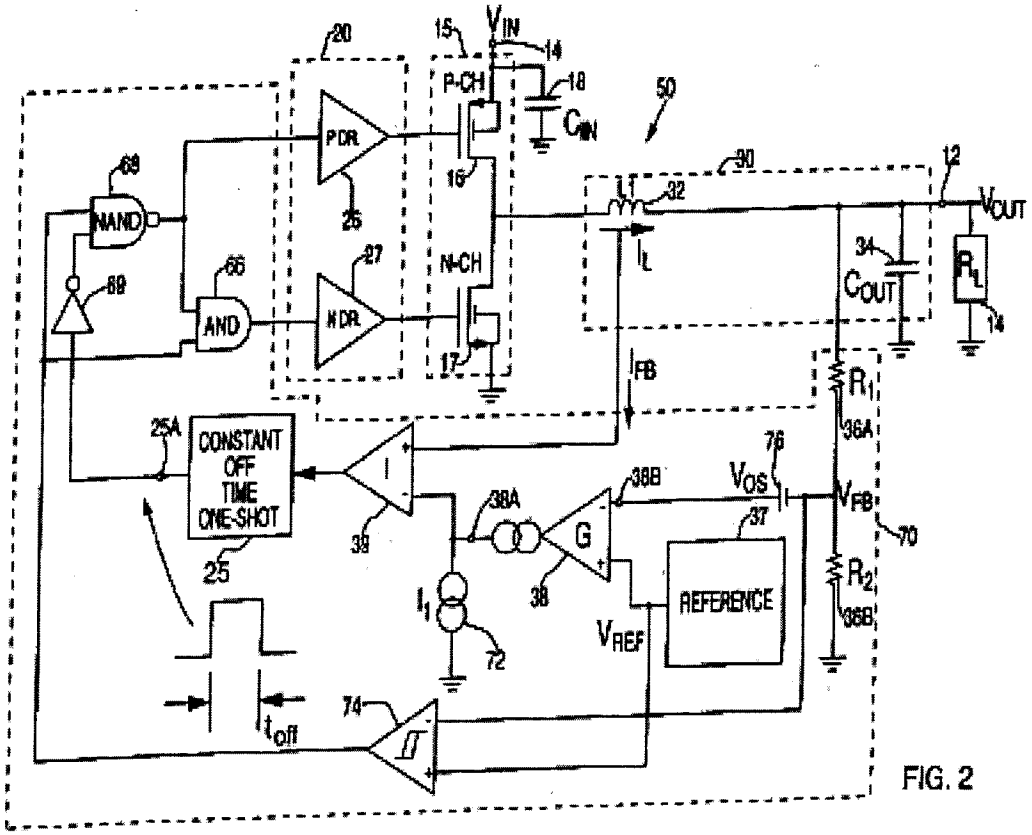

FIG. 2

(claims 2, 3, and 34), and the "reverse current" claim (claim 35). The sleep mode claims of the '258 patent cover a circuit and method for controlling a switching voltage regulator which operates to control the two transistors (e.g., 16 and 17) in the voltage regulator circuit (Fig. 2 of the '258 patent, above) to be OFF at the same time so as to conserve power used by the voltage regulator. The reverse current claim of the '258 patent covers a circuit for controlling a switching voltage regulator which operates to turn one of the pair of transistors OFF on the

condition that a monitored current falls below a certain threshold, so that current does not flow in reverse through the voltage regulator circuit to ground and drain power from the load.

III. DETERMINATION ON VIOLATION

For the reasons set forth below, we determine to reverse-in-part the subject ID finding no violation of section 337 by AATI's accused products with respect to the '258 patent. In that connection, we modify (broaden) the construction of the relevant claims of the '258 patent, reverse the ALJ's finding of no infringement as to the sleep mode claims (claims 2, 3, and 34), affirm the ALJ's finding of no infringement as to the reverse current claim (claim 35), and affirm the ALJ's findings of validity of claims 2, 3, and 34 and invalidity of claim 35.

Specifically, we modify (broaden) the ALJ's claim construction of three terms of the '258 patent: (i) "a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors" (all asserted claims), (ii) "substantially at the regulated voltage" (claims 2, 3, and 34), and (iii) "first state of circuit operation" and "second state of circuit operation" (all asserted claims).

We also modify the ALJ's application of three additional terms of asserted claims 2 and 3 of the '258 patent: (i) "a second circuit for generating a first control signal during a first state of circuit operation" and "a third circuit for generating a second control signal during a second state of circuit operation," (ii) "first control signal ... second control signal," and (iii) "a second control signal during a second state of circuit operation to cause both switching transistors to be OFF." Applying our claim construction, we determine to reverse-in-part the ALJ's finding of no direct infringement of the '258 patent, determine that AATI's accused product AAT1143 directly

infringes claims 2, 3, and 34, and fails to infringe claim 35 either literally or under the doctrine of equivalents. We affirm the ALJ's finding of no infringement by the other three accused representative products (AAT1146, AAT1151, and AAT1265) based on the discussion in this opinion. We do not reach the ALJ's finding of no indirect infringement of any of the asserted claims of the '258 patent.

With respect to validity, we affirm the ALJ's rulings that claims 2, 3, and 34 are valid and that claim 35 is invalid due to anticipation.

As discussed *infra*, we determine to issue a limited exclusion order with respect to claims 2, 3, and 34 of the '258 patent, that the remedy shall not extend to downstream products incorporating the infringing articles, that the public interest factors set out in section 337(d) do not preclude issuance of that remedy, and that the amount of bond to permit importation during the Presidential review period should be set at 100 percent of the entered value of the involved articles.

IV. ISSUES

A. Claim Construction

1. Applicable Law

Claim construction "begin[s] with and remain[s] centered on the language of the claims themselves." *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 830 (Fed. Cir. 2003); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*), *cert. denied*, 126 S.Ct. 1332, 164 L.Ed.2d 49 (2006). The language is read in the context of the entire patent, including the specification. *Phillips*, 415 F.3d at 1313-14. The court may consult the intrinsic

evidence, including the claims themselves, the specification, and the prosecution history, and, under some circumstances, may also consult extrinsic evidence, such as dictionaries, treatises, and expert testimony. *Phillips*, 415 F.3d at 1318. It is the claims of the patent which measure the right to exclude. *See, e.g., Johnson & Johnston Assocs. Inc. v. R.E. Service Co., Inc.*, 285 F.3d 1046, 1052 (Fed. Cir. 2002) (*en banc*).

Claim construction is a question of law. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995)(*en banc*), *aff'd*, 517 U.S. 370 (1996). For the reasons that follow, we have determined to modify the construction of the asserted claims of the '258 patent.

2. Sleep Mode Claims (claims 2, 3, and 34)

The asserted sleep mode claims of the '258 patent are dependent apparatus claims 2 and 3, which depend from independent claim 1, and independent method claim 34. For convenience, non-asserted claim 1 and asserted claims 2, 3, and 34 are reproduced below with claim limitations construed by the ALJ in the ID in his claim construction section (ID 3-25) in bold, and with additional claim limitations applied by the ALJ in his infringement analysis (ID 48-55, 56-58) underlined.

> 1. A circuit for controlling a switching voltage regulator, the regulator having (1) a **switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors** and (2) an output for supplying current at a regulated voltage to a load which includes an output capacitor, the circuit comprising:
>
> > a first circuit for monitoring the output to generate a first feedback signal;
> >
> > a <u>second circuit for generating a first control signal</u> during a **first state of circuit operation**, the first control signal being responsive to the first feedback signal to vary the duty cycle of the switching

transistors to maintain the output at the regulated voltage; and

a third circuit for generating a second control signal during a **second state of circuit operation** to cause both switching transistors to be OFF for a first period of time during which the output capacitor maintains the output **substantially at the regulated voltage.**

2. The circuit of claim 1 wherein the second control signal is generated in response to the first feedback signal.

3. The circuit of claim 2 wherein the circuit changes from the second to the **first state of operation** in response to the magnitude of the first feedback signal falling below a first threshold level.

34. A method for controlling a switching voltage regulator, the regulator having (1) **a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors** and (2) an output for supplying current at a regulated voltage to a load which includes an output capacitor, the method comprising the steps of:

(a) monitoring the output to generate a first feedback signal;

(b) varying the duty cycle of the switching transistors in response to the first feedback signal to maintain the output at the regulated voltage during a **first state of circuit operations**;

(c) turning both switching transistors OFF for a first period of time following the **first state of circuit operation** so as to allow the output capacitor to maintain the output **substantially at the regulated voltage** by discharging during a **second state of circuit operation**; and

(d) turning at least one of said switching transistors ON to recharge the output capacitor following the **second state of circuit operation.**

3. Reverse Current Claim (claim 35)

The asserted reverse current claim of the '258 patent is independent apparatus claim 35, reproduced below with claim limitations construed by the ALJ in the ID in his claim construction

section (ID 3-25) in bold, and with additional claim limitations applied by the ALJ in his infringement analysis (ID 48-55, 56-58) underlined.

> 35. A circuit for controlling a switching voltage regulator, the regulator having (1) **a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors** and (2) an output for supplying current at a regulated voltage to a load which includes an output inductor, the circuit comprising:
>
> a first circuit for monitoring the output to generate a first feedback signal;
>
> a second circuit for generating a first control signal during a first state of circuit operation, the first control signal being responsive to the first feedback signal to vary the duty cycle of the switching transistors to maintain the output at the regulated voltage; and
>
> a third circuit for **monitoring the current to the load** to generate a second control signal during a second state of circuit operation to cause one of said switching transistors to be maintained OFF when the magnitude of the monitored current falls below a **current threshold**.

4. Claim Terms at Issue

a. "a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors"

The ALJ's ID

The ALJ construed the claim term "a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors," which occurs in all of the asserted claims of the '258 patent, to require that "the switching transistors of the claimed invention are configured in a single switch" (ID 19), that the switching transistors are connected so as to be "controlled as a single unit" (ID 17), and that "[t]hey can, as AATI argues, be thought of as operating as a single unit." (ID 19) (citing expert testimony of AATI's expert, Dr. Wei).

The ALJ thus interpreted the pair of switching transistors (*i.e.*, 16 and 17 in Fig. 2 of the '258 patent) to be a "single unit" controlled at a single node which required a single control circuit to control the transistors. ID 17-19, 47. As discussed *infra*, based on this construction of the claims, the ALJ found that the accused AATI products did not infringe the claims of the '258 patent since the accused products require two separate control circuits to control two switching transistors. ID 47-48.

Linear's Position

Linear argues that the ALJ's requirement that the two transistors be controlled by a single node, and thus the same unitary control circuitry, improperly limits the claims to a perceived preferred embodiment. Linear Review Brief 23-24. Linear further argues that not only did the ALJ misapply the law governing claim construction, he also misread the patent, pointing out that Fig. 2, relied on by the ALJ in reaching his claim construction determination, does not disclose two transistors controlled by a single node. Linear Review Brief 24-25. Linear argues that "[n]othing in the claim language, in the patent specification, or in the prosecution history of the '258 [p]atent restricts its claims to two switching transistors controlled from a single node" and notes that "neither the words 'control' nor 'node' appear anywhere in the patent." Linear Review Brief 24. Finally, Linear asserts that a proper reading of Fig. 2 shows that two driving signals emanate from circuit elements 25 and 74, respectively, and are then fed to separate circuit elements (drivers 26 and 27), and that "[a]s such, the driving signals do not originate from a "single node" to control the switching behavior of both transistors." Linear Review Brief 25.

AATI's Position

AATI argues that the ALJ's claim construction is correct, *i.e.*, that the asserted claims require that the two transistors be controlled as part of a single unitary switch, and that "the two transistors must operate as a single unit" and "[t]he switching of those two transistors is controlled by a single node." AATI Review Reply Brief 28. However, AATI also argues that "Judge Harris's [the ALJ's] claim construction does not require that the two transistors be controlled by a single node." AATI Review Reply Brief 30. AATI further argues that the claim language and the specification support their interpretation (AATI Review Reply Brief 28), and that "nothing in the specification suggests a broader meaning for this claim language" (AATI Review Reply Brief 29). AATI also takes the position that Linear's and the IA's claim construction improperly define the term functionally, instead of structurally. AATI Review Reply Brief 27-31.

The IA's Position

The IA argues that the ALJ erred insofar as he sought to confine the asserted claims to the specific type of switch structure shown in Figure 2 of the patent. IA Review Brief 15. The IA argues that although "[t]he specification of the '258 patent explicitly states that 'the term "synchronously-switched switch" refers to a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load'" (column 7, lines 48-51 of the '258 patent), the ID "adds the requirements that the two transistors must be configured in a single switch and operate within a single unit." IA Review Brief 13-14. The IA also argues that separate control circuitry should not disqualify switching transistors from satisfying the claim

term of "a switch ... including a pair of synchronously switched switching transistors." IA Review Brief 14. Finally, the IA argues that AATI and the ID incorrectly require the two transistors to use the same control circuitry, and that "separate control circuitry" should not disqualify the transistors from functioning as a single unitary switch. IA Review Reply Brief 2-4.

Determination

We determine to modify the ALJ's claim construction. We agree with the IA's arguments that "synchronously switched switch" is broadly defined by the text of the '258 patent as "a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load." IA Review Brief 13; *see also* column 7, lines 48-51 of the '258 patent. We also agree that "[t]he ID errs insofar as it seeks to confine the asserted claims to the specific type of switch control structure shown in Figure 2." IA Review Brief 15. We also agree with Linear that "[n]othing in the claim language, in the patent specification, or in the prosecution history of the '258 Patent restricts its claims to two switching transistors controlled from a single node." Linear Review Brief 24.

Even assuming, for the sake of argument, that only Fig. 2 is instructive in interpreting the claims, we agree with Linear's argument that contrary to the ALJ's reasoning, "Figure 2 does not disclose 'two transistors controlled by a single node.'" Linear Review Brief 24. We also agree with Linear that "[n]otably, neither the words 'control' or 'node' appear anywhere in the ['258] patent." Linear Review Brief 24.

Specifically, we note that the first embodiment, Figure 2, of the '258 patent is exemplary. Figure 2 shows a switch (15) including a pair of synchronously switched transistors (16 and 17)

controlled by two nodes. The first node is the one pointed out by the ALJ at page 18 of the ID which is at the junction of the top input to NAND gate 68 and the bottom input to AND gate 66, and the second node is the one at the output of NAND gate 68 and connected to the top input of AND gate 66. The transistors (16 and 17) are synchronously controlled by control circuit 70 which in turn is composed of at least two separate circuits, a voltage feedback circuit and a current feedback circuit, which control these two nodes, respectively. Although Figure 2 clearly delineates the boundaries and therefore the components of control circuit 70 (see the dashed line), it does not clearly delineate the boundaries and components of the current feedback circuit and voltage feedback circuit. The first node is controlled by the voltage feedback circuit which comprises at least reference source 37 and hysteretic comparator 74. The second node is controlled by the current feedback circuit which comprises at least current source 72, current comparator 39, and one-shot circuit 25.

We also agree with Linear's alternative analysis that Fig. 2 shows that two driving signals emanate from circuit elements 25 and 74, respectively, and are fed then to separate circuit elements (drivers 26 and 27), and that "[a]s such, the driving signals do not originate from a 'single node' to control the switching behavior of both transistors." Linear Review Brief 24-25.

Thus, in our view, the ALJ appears to have erred in limiting the asserted claims of the '258 patent to a synchronously switched switch having a single control circuit controlling the transistors from a single node as a single unit. The ALJ's claim construction of this term in the ID seems to be contrary to the plain meaning of the words of the asserted claims, and more limiting than the definition provided in the specification of the '258 patent (column 7, lines 48-

51) requires.[1]

Accordingly, because there are at least two distinct nodes which correspond to at least two distinct control circuits, we do not agree with the ALJ that the specification limits the claims to only one node and only one control circuit. In our view, a proper construction of the claim term should not preclude the existence of more than one control circuit or more than one control node.

We determine to modify the construction to mean that "synchronously switched switch" is "a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load." IA Review Brief 13; *see also* column 7, lines 48-51 of the '258 patent. Under this construction, during normal operation of the two transistors, one must be ON while the other is OFF (except for deadtime), without precluding both being OFF at the same time (*i.e.*, sleep mode), and that more than one separate control circuit and/or more than one control node are not precluded.

b. "substantially at the regulated voltage"

The ALJ's ID

The ALJ considered the construction of the claim term "substantially at the regulated voltage" (ID 19-23) with respect to claims 2, 3, and 34, specifically construing the term "substantially." He found that upon examination of the entire claim language and specification, the term "substantially" does not merely indicate a certain tolerance or leeway, but is used to

[1] As stated in the '258 patent, "the term 'synchronously-switched switch' refers to a switch including two transistors that are driven out of phase to supply current at a regulated voltage to a load." Column 7, lines 48-51.

mean that the voltage should not be the same as the regulated voltage and that the difference between the voltages is important for operation of the claimed invention. ID 23. The ALJ noted the expert testimony of Dr. Wei (AATI's expert), stating that "the average values must be different in the two states in order for the two circuits to operate...." ID 21. The ALJ thus agreed with AATI's narrow construction of the claims of the '258 patent that the "regulated voltage" in the first state must be different than the "substantially regulated voltage" in the second state due to the presence of the term "substantially" (ID 20-21), and found that "the term substantially at the regulated voltage requires that in the second state of circuit operation, the voltage is maintained substantially at the regulated voltage although not at the same voltage." ID 23.

Linear's Position

Linear argues that the ALJ's construction in the final ID is contrary to the plain meaning of the claim language and inappropriately limits the claims to specific embodiments in the specification; that the interpretation of "substantially at the regulated voltage" in the *Impala* litigation (that the claim term "allows for, but does not require, greater variation in the regulated voltage") is dispositive of this issue; that the ALJ's construction of "substantially at the regulated voltage" contradicts well-established Federal Circuit law interpreting the term "substantially;" that the ALJ erred in reading "substantially at [the][sic] regulated voltage" to mean "not at the regulated voltage;" that the ALJ's analysis limits the construction to a preferred embodiment containing a hysteretic comparator; and that it violates the doctrine of claim differentiation because its implicitly reads the hysteretic comparator limitation from claim 5 into claim 1 (and thus into dependent claims 2 and 3). Linear Review Brief 18-22.

AATI's Position

AATI generally argues that the ALJ's construction of the the term "substantially at the regulated voltage" is correct. AATI Review Reply Brief 31-39. AATI argues that the evidence supports a finding that the voltages are different in the two states for proper operation (AATI Review Reply Brief 31-33), and that the Federal Circuit case law cited by Linear relating to "substantially" is not pertinent because none of those cases involved a difference between two conditions necessary for operation of the claimed invention here. AATI Review Reply Brief 33-34. AATI also argues that the *Impala* litigation "cannot legally bind AATI in this investigation" and did not relate to the same claim construction issue. AATI Review Reply Brief 34-35. AATI also argues that Linear incorrectly asserts that the ALJ's construction of this term limits the asserted claims to a specific embodiment involving a hysteretic comparator. AATI Review Reply Brief 35-38.

The IA's Position

The IA argues that the ALJ's construction is contrary to the plain meaning of the claim language and inappropriately limits the claims to one particular disclosed embodiment. IA Review Reply Brief 13-14. Specifically, the IA argues that the term "substantially at the regulated voltage," describing the second state of circuit operation, stands in contrast to the asserted claims' description of the first state of circuit operation requiring that the output be maintained "at" the regulated voltage. IA Review Brief 25. The IA argues that the use of the word "substantially" merely establishes that in the second state of circuit operation the output voltage can vary from the designated level to a greater degree than in the first state of circuit

operation. IA Review Reply Brief 14. The IA further argues that "[t]he ID's construction of 'substantially at the regulated voltage' should be rejected because it imposes a limitation that is not compelled by the language of the claim." IA Review Brief 26.

Determination

As pointed out by the ALJ in the ID, the claim construction dispute among the parties is centered on the meaning of the term "substantially." ID 20. We agree with the ALJ that the interpretation of this term in the *Impala* litigation as allowing for, but not requiring, greater variation in the regulated voltage is informative, although not dispositive. *See* ID 12-14, 21. We agree with Linear that "[w]hen construing 'substantially' as a term of approximation modifying a condition, the Federal Circuit does not exclude the exact condition from the meaning of the construed term" and that "the ALJ clearly erred in reading 'substantially at the regulated voltage' to exclude 'at the regulated voltage.'" Linear Pet. 27, Linear Review Brief 20.

We agree with Linear that "[t]he plain and ordinary meaning of the term 'substantially at the regulated voltage' encompasses voltages that are near or 'at the regulated voltage.'" Linear Review Brief 19. We agree with the IA that in the second state of circuit operation the output voltage can vary from the designated level to a greater degree than in the first state of circuit operation. IA Review Reply Brief 14. We also agree with the IA that if Linear "intended to *require* the use of a different average output voltage during the sleep mode of operation, the patent could have been drafted so as to make that intent clear." IA Review Reply Brief 14.

The ALJ and AATI appear to place undue emphasis on one of the disclosed embodiments, contrary to established Federal Circuit precedent. *See Ventana Medical System,*

Inc. v. Biogenex Laboratories, Inc., 473 F.3d 1173, 1181-82 (Fed. Cir. 2006) (finding that the mere fact that embodiments included a particular example does not limit claims to that example); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (claim need not be limited to single embodiment disclosed in the specification); *see also Cordis Corp. v. Medtronic AVE, Inc.*, 339 F.3d 1352, 1365 (Fed. Cir. 2003), *cert. denied*, 540 U.S. 1213 (2004) ("As our case law makes clear, however, 'an applicant is not required to describe in the specification every conceivable and possible future embodiment of his invention.'"). Thus, we agree with both the IA and Linear that the ALJ's construction in the final ID is contrary to the plain meaning of the claim language and inappropriately limits the claims to the hysteretic comparator embodiments of the specification (*see* at least embodiments of Figures 2, 7, 9, and 10), since other embodiments exist which do not require a hysteretic comparator (*see* at least the embodiments of Figures 4, 5, 6, and 8). IA Review Brief 26-27, IA Pet. 14, Linear Review Brief 20-22.

Lastly, although we agree with Linear that the doctrine of claim differentiation supports the view that asserted claims 2 and 3 do not require the hysteresis embodiment from the specification (Linear Review Brief 22), we find that claims 2 and 3 do not exclude the hysteresis embodiment. For the foregoing reasons, we conclude that the ALJ erred in limiting the asserted claims of the '258 patent such that the "regulated voltage" of the first state of circuit operations must be different than the "substantially regulated voltage" of the second state of circuit operation.

Accordingly, we determine to modify the ALJ's construction of the term "substantially at the regulated voltage" to mean that in the second state of circuit operation the output voltage is

maintained substantially at the regulated voltage although not necessarily at the same voltage as in the first state of circuit operation. In our view, a proper construction of the claim term permits the output voltgages in the two states of operation to be different, but does not require them to be different.

c. "first state of operation" and "second state of operation"

The ALJ's ID

With respect to all the asserted claims of the '258 patent, the ALJ considered the construction of the claim terms "first state of operation" and "second state of operation" at ID 23-25. Here again, as with the second claim term he construed, the ALJ relied on the expert testimony of Dr. Wei (AATI's expert) in determining that the first and second states of operation correspond to high and low load currents, respectively. ID 24. The ALJ found that "the first state of operation is linked to high load currents, and the second state is linked to low load currents." ID 25.

Linear's Position

Linear argues that the ALJ's construction of these claim terms improperly reads in a limitation that excludes disclosed embodiments, and points to portions of the specification of the '258 patent (column 7, lines 11-14 and 19-23; column 9, lines 3-10; and column 13, lines 20-25) which disclose changing between first and second states of operation during a period of low load current (*i.e.*, sleep mode). Linear Review Brief 26-29. Linear argues that a "proper construction for the 'first state of circuit operation' and the 'second state of circuit operation' in no way requires that these two states of circuit operation be linked to any particular load current levels."

Linear Review Brief 28. Linear also argues that the claim language provides no limitations linking the first and second states to corresponding load conditions. Linear Review Brief 26-29.

AATI's Position

AATI argues that the ALJ's construction is correct. AATI Review Reply Brief 38-42. AATI argues that the ALJ properly read the claim terms in the context of the patent specification and that the states are defined by the load current condition such that "the first state of circuit operation is linked to high load currents and the second state of circuit operation is linked to low load current." AATI Review Reply Brief 39. AATI argues that "[t]he file history of the '258 patent also supports Judge Harris's construction." AATI Review Reply Brief 40. AATI also argues that despite the IA's assertion that the ID's construction improperly imports limitations from the preferred embodiment into the claim, the ALJ "properly read the claim terms as a person of ordinary skill would in the context of the patent specification" based on a "finding that all of the embodiments in the '258 patent require a linking between the first state/second state and the load current" and that "the distinction based on load current is a required characteristic of the way in which the claimed invention works." AATI Review Reply Brief 42 (emphasis in original).

The IA's Position

The IA argues that the claim language does not require a link between the load current and the claimed states of operation and that such a construction imports a limitation from the preferred embodiments into the claims. IA Review Brief 19-21, IA Review Reply Brief 7-11.

Determination

In our view, the ALJ's construction of the asserted claims of the '258 patent that "the first state of operation is linked to high load currents, and the second state is linked to low load currents" (ID 25), is too narrow. We agree with Linear and the IA that the ALJ's construction of this term in the ID seems contrary to the plain meaning of the words of the asserted claims, and that "[n]othing in the claim language, however, requires a link between the load current and the claimed states of circuit operation." IA Review Brief 20. With respect to Linear's argument that "the ALJ's reading of the claim limitation is ... precluded by the specification" (Linear Pet. 37), although the specification teaches that the circuit can operate to "periodically change back and forth between the second and first states even during periods of low load current [*i.e.*, during sleep mode]" (Linear Pet. 35), the specification does not require such operation at all times. Thus, contrary to AATI's arguments, the specification of the '258 patent does not support the conclusion that all of the embodiments in the '258 patent require a link between the state of operation and the load current. In other words, the specification supports the possibility, but not the necessity, that load current and states of circuit operation be linked.

We therefore determine to modify and broaden the ALJ's construction of the terms "first state of operation" and "second state of operation" to mean that the first state of operation can be linked to high load currents, and the second state can be linked to low load currents, although the states of operation do not necessarily have to be linked to a high or low load current.

B. Infringement of the '258 Patent

1. Applicable Law

Direct infringement requires a two-step analysis. First, the claims must be construed and then the trier of fact must determine whether the claims cover the accused device or process, literally or under the doctrine of equivalents. *Smithkline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988). The burden is on the patent owner to prove infringement by a preponderance of the evidence. *Smithkline Diagnostics*, 859 F.2d at 889.

A product which does not literally infringe, however, may still infringe under the doctrine of equivalents when, for example, the accused product and the claimed invention perform substantially the same function in substantially the same way to yield substantially the same result. *Atlas Powder Co. v. E.I. duPont de Nemours & Co.*, 750 F.2d 1569, 1579 (Fed. Cir. 1974). The Supreme Court has described the essential inquiry of the doctrine of equivalents analysis as follows: "[D]oes the accused product or process contain elements identical or equivalent to each claimed element of the patented invention?" *Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 40 (1997). Evidence must be presented on a limitation-by-limitation basis, and not for the invention as a whole. *Warner-Jenkinson*, 520 U.S. at 29. Thus, if an element is missing or not satisfied, infringement cannot be found under the doctrine of equivalents as a matter of law. *See, e.g., Wright Medical*, 122 F.3d 1440, 1444 (Fed. Cir. 1997); *Dolly, Inc. v. Spalding & Evenflo Cos., Inc.*, 16 F.3d 394, 398 (Fed. Cir. 1994); *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538-39 (Fed. Cir. 1991); *Becton Dickinson and Co. v. C.R. Bard, Inc.*, 922 F.2d 792, 798 (Fed. Cir. 1990).

The concept of equivalency cannot embrace a structure that is specifically excluded from the scope of the claims. *Athletic Alternatives v. Prince Mfg., Inc.*, 73 F.3d 1573, 1581 (Fed. Cir. 1996). In applying the doctrine of equivalents, the Commission must be informed by the fundamental principle that a patent's claims define the limits of its protection. *See Charles Greiner & Co. v. Mari-Med. Mfg., Inc.*, 962 F.2d 1031, 1036 (Fed. Cir. 1992). As the Supreme Court has affirmed:

> Each element contained in a patent claim is deemed material to defining the scope of the patented invention, and thus the doctrine of equivalents must be applied to individual elements of the claim, not to the invention as a whole. It is important to ensure that the application of the doctrine, even as to an individual element, is not allowed such broad play as to effectively eliminate that element in its entirety.

Warner-Jenkinson, 520 U.S. at 29.

Indirect infringement consists of active inducement of others to directly infringe, or contributory infringement, and depends on the existence of direct infringement. *Dynacore Holdings Corp. v. U.S. Philips Corp.*, 363 F.3d 1263, 1272 (Fed. Cir. 2004).

2. Discussion

Based on his construction of claims 2, 3, 34, and 35, discussed *supra*, along with the interpretation of additional claim terms, discussed *infra*, the ALJ found that none of the accused AATI products directly or indirectly infringe any of the asserted claims of the '258 patent. ID 63.

The ALJ's ID

The ALJ made factual findings based on the evidence "that the switching transistors in the accused AATI products are not configured in a single switch, and that instead the switching

transistors [of the accused products] have separate control circuitry," and that "[t]hey are not controlled as a single unit." ID 47. As a result of these findings, the ALJ found that the accused products do not meet the limitation of the asserted claims 2, 3, and 34 of "a switch . . . including a pair of synchronously switched switching transistors," since the accused products require two separate control circuits to control two switching transistors. ID 47-48, 60.

The ALJ also found that the representative accused products (AAT1143, AAT1146, AAT1151, and AAT1265) do not infringe the asserted sleep mode claims of the '258 patent "because they maintain the same average voltage in both the alleged first and second states of operation" and they "do not maintain the output at a different voltage in the first and second states." ID 59. They thus do not meet the "substantially at the regulated voltage" of asserted claims 2, 3, and 34.

He found that "at least the AAT1143, AAT1146, and AAT1151 representative products do not depend on states of operation with the requisite high or low load currents" and thus that "at least three of the four representative AATI products accused under the '258 patent lack the required 'first state of circuit operation' and 'second state of circuit operation'" of asserted claims 2, 3, and 34. ID 55-56.

As to claim 35, the ALJ found that the accused devices (AAT1143 and AAT1146) failed to meet the limitation of "a switch . . . including a pair of synchronously switched switching transistors" for the same reason the accused devices did not meet the similar limitations in claims 2, 3, and 34. ID 60. The ALJ also determined that no accused product (AAT1143 or AAT1146) satisfies the limitation of claim 35 of "monitoring the current to the load," since monitoring of

instantaneous inductor current was not shown as a matter of fact to constitute monitoring current to the load. ID 60-61. The ALJ also concluded that the accused products (AAT1143 and AAT1146) do not meet the limitation of claim 35 of comparing monitored current to "a current threshold" since "the accused products compare ... monitored voltage to a voltage threshold, not to a current threshold as required by claim 35." ID 62.

The ALJ found that Linear had not presented evidence of literal infringement under the doctrine of equivalents. ID 62-63. Lastly, because there was no finding of direct infringement with respect to any asserted claim of the '258 patent, and because "indirect infringement, whether inducement to infringe or contributory infringement, can only arise in the presence of direct infringement" (*Dynacore Holdings Corp.*, F.3d at 1272), the ALJ likewise concluded there was no indirect infringement of the asserted claims of the '258 patent. ID 71-72.

Additional Terms Applied By the ALJ in His Infringement Analysis

Although not discussed by the ALJ in the claim construction section of the ID, the ALJ applied three additional terms in the course of making his determination of non-infringement: (i) "a second circuit for generating a first control signal during a first state of circuit operation" and "a third circuit for generating a second control signal during a second state of circuit operation," (ii) "first control signal ... second control signal," and (iii) "a second control signal during a second state of circuit operation to cause both switching transistors to be OFF." ID 48-55, 56-58.

(i) *"second circuit ..." and "third circuit ..."*

With respect to the first additional term applied by the ALJ with regard to infringement, the ALJ found that none of the accused products (AAT1143, AAT1146, AAT1151, and

AAT1265) meet the limitations of claim 1 (and thus asserted claims 2 and 3 depending therefrom) of "a second circuit for generating a first control signal during a first state of circuit operation" and "a third circuit for generating a second control signal during a second state of circuit operation." ID 48-55. He arrived at the same conclusion for claim 34 because of its similar limitations. ID 48, 55. Based on the second and third circuits having different operations ascribed to them, the ALJ interpreted claims 1 and 34 to require that the second and third circuit be separate and distinct. ID 52. However, the ALJ made findings of fact (based primarily on the expert testimony of AATI's expert, Dr. Wei) that the second and third circuits of the accused products are not separate and distinct, since "the portions of each of the accused devices alleged to constitute the second circuit and the third circuit are the same, with the exception of ." ID 52. Further, the ALJ determined that failed to fulfill the required operations of the third circuit, and thus he determined that failed to distinguish the second and third circuits as two distinct circuits. ID 52-53.

(ii) *"first control signal ... second control signal"*

With respect to the second additional term ("first control signal ... second control signal"), Linear identified the signal of the accused AAT1143 product as the "first control signal" and of the accused AAT1143 product as the "second control signal." ID 56. The ALJ stated that and found that "in the accused products are not two distinct signals, and the accused products do not contain the required limitation." *Id.*

(iii) *"a second control signal during a second state of circuit operation to cause both switching transistors to be OFF"*

With respect to the third additional term, the ALJ found that the AAT1143, AAT1146, and AAT1151 products "do not contain any control signal that causes both transistors to be OFF and do not perform any step that turns both transistors OFF." ID 57. The ALJ based this finding on the testimony of Dr. Wei (AATI's expert) that the AATI accused products use

, and that intervention of

is required to perform the function of turning both transistors OFF. ID 57-58.

He concluded that the accused products do not satisfy the "second control signal" limitation of claims 2 and 3. ID 58. He also found that the accused products do not meet the requirement of claim 34 of the step of turning both transistors OFF. ID 58.

The Parties' Positions

Linear (Linear Review Brief 48-66) and the IA (IA Review Brief 13-33) argue that the accused products infringe the asserted claims of the '258 patent. Both Linear and the IA present arguments not only with respect to literal infringement (Linear Review Brief 48-65, IA Review Brief 13-29, IA Review Reply Brief 2-15), but also with respect to infringement under the doctrine of equivalents (Linear Review Brief 1-5, 65-66; Linear Review Reply Brief 2-18; Linear Pet. 62-63; IA Review Brief 29-31, IA Review Reply Brief 15-17 (as to claim 35)), and indirect infringement (active inducement and contributory infringement) (Linear Review Brief 5-15, Linear Review Reply Brief 19-27; IA Review Brief 31-33; IA Review Reply Brief 17-19).

AATI argues that the ALJ correctly found that the accused products do not infringe claims 2, 3, and 34 (*i.e.,* the sleep mode claims) (AATI Review Reply Brief 42-65). AATI also

argues that the ALJ's determination of non-infringement with respect to claim 35 (*i.e.*, the reverse current claim) is correct (AATI Review Brief 2-29, AATI Review Reply Brief 65-72), that the accused products monitor instantaneous inductor current rather than current to the load (AATI Review Brief 18), and that the accused products monitor a voltage and voltage threshold and not a current threshold. AATI Review Brief 2-29, AATI Review Reply Brief 65-72.

Direct Infringement[2]

"switch . . . including a pair of synchronously switched switching transistors"

With respect to the all of the asserted claims of the '258 patent, Linear argues that each of the accused products meets the limitation "switch . . . including a pair of synchronously switched switching transistors." Linear Review Brief 48-50. Linear argues that in the accused products the ZC signal plays no part in the switching of the top and bottom transistors at high load currents, and that thus the accused products have a signal that is generated by the top switch logic to control both the top switching transistor and the bottom switching transistor. Linear Review Brief 49-50. Thus, Linear asserts that in the accused products "the AATI switching transistors are indeed connected for complementary switching and are controlled as a single unit - just like the circuit set up shown in multiple embodiments of the '258 Patent." Linear Review Brief 50. Linear also argues that the accused products infringe this limitation under the doctrine of equivalents. Linear Review Brief 65-66, Linear Review Reply Brief 2-18. For these reasons, Linear argues that the AAT1143 and AAT1146 products satisfy the limitation of a "switch . . .

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[2] Given our finding that AATI directly infringes the asserted claims, it is not necessary to reach the issue of whether AATI indirectly infringes those claims. We also note that indirect infringement here is based on direct infringement by third parties importing an infringing product (itself or via downstream products), but that evidence in the record is slight on this point.

including a pair of synchronously switched switching transistors." Linear Review Brief 63.

AATI argues that the accused AAT143 and AAT1146 products do not infringe any of the asserted claims with respect to the limitation "switch . . . including a pair of synchronously switched switching transistors." AATI Review Reply Brief 43-45, 65. AATI argues that "the accused products do not satisfy this limitation because

AATI Review Reply Brief 43. AATI also argues that

and that "the accused products have

." AATI Review Reply Brief 44. AATI also disputes the IA's interpretation that the accused products "effectively operate" in a synchronous manner. AATI Review Reply Brief 45. However, we note that AATI appears to admit that the limitation of all of the asserted claims of "a switch ... including a pair of synchronously switched switching transistors" is met when it states "that the switching transistors may appear to switch in a synchronous manner under certain operating conditions." AATI Review Reply Brief 45.

With respect to all of the asserted claims of the '258 patent, the IA argues that "the transistors of the accused AATI products operate in essentially the same complementary manner as the switches in the patent under high load conditions" (IA Pet. 7), and that "[t]he ID errs insofar as it seeks to confine the asserted claims to the specific type of switch control structure shown in Figure 2." IA Review Brief 15. The IA also argues that "the evidence indicates, despite their purportedly 'separate' control circuitry, that the transistors of the accused products

effectively operate in a synchronous manner as part of a single switch." IA Review Brief 16.

"first state of circuit operation ... second state of circuit operation"

As to claims 2, 3, and 34, Linear argues the first and second states of circuit operation are not restricted to any specific levels of load currents, and that they are distinct states in any event and met by the accused products. Linear Review Brief 26-29, 51-54. AATI argues that the first and second states of operation of the asserted claims must be distinct, a limitation not met by the accused products. AATI Review Reply Brief 48-54. The IA agrees with Linear. IA Review Brief 19-21, IA Review Reply Brief 7-11. The IA specifically points out that, contrary to the ID's conclusions based on Dr. Wei's testimony (AATI's expert), "the accused AATI products do have distinct states of operation that correspond to the load current level." IA Review Brief 20.

"substantially at the regulated voltage"

Linear argues that "[u]nder the proper construction in which 'substantially at the regulated voltage' encompasses 'at the regulated voltage,' the '258 Accused Products infringe." Linear Review Brief 60. Linear argues similarly that under the doctrine of equivalents maintaining at a voltage is encompassed by maintaining substantially at a voltage. Linear Review Brief 66. Linear also argues that the '258 accused products infringe even under the ALJ's improper construction requiring operation at a different voltage in the first and second states, because AATI's products exhibit greater (*i.e.*, different) variation in the regulated voltage during the second state than they do during the first state. Linear Review Brief 60-63. Linear supports this argument by pointing to graphs showing load current conditions taken from AATI's product datasheets, and argues that these graphs show that the AATI products maintain output at

different regulated voltage levels depending on different states of circuit operation. Linear Review Brief 61-63, Linear Pet. 56-59. Specifically, Linear points out that the AAT1151 has a low load current state (*i.e.*, second state at 50mA) and a high load current state (*i.e.*, first state at 700mA) (Linear Review Brief 61), and that since regulated voltage is dependent upon the I(EA) signal (shown in RDX-664, Linear Review Brief 63), "a voltage difference in the I(EA) values necessarily indicates different value for the regulated voltage as well." Linear Review Brief 62.

AATI argues that the ALJ's claim construction and non-infringement rulings "relate[s] to the *average* voltage level in each state, not to the amount of *variation* (or ripple) about those average voltages" (AATI Review Reply Brief 62 (emphasis in original)), and that "[w]hether the products show different amounts of variation about the average voltage is irrelevant to the infringement question." AATI Review Reply Brief 62. AATI also argues that "a change in I(EA) provides no indication of a change in the average output voltage." AATI Review Reply Brief 64. AATI argues in favor of the ALJ's non-infringement ruling based on its assertion that "the phrase 'an output maintained substantially at the regulated voltage' should be construed to require operation at a different average voltage in the first and second states." AATI Review Reply Brief 62.

With respect to the sleep mode claims, the IA argues that the ID's construction of 'substantially at the regulated voltage' is contrary to the plain meaning of the claim language and inappropriately limits the claims to the disclosed embodiments. IA Review Brief 26-27; *see also* IA Review Reply Brief 14. The IA also argues that the use of the word "substantially" merely establishes that in the second state of circuit operation the output voltage can vary from the

designated level to a greater degree than in the first state of circuit operation, and that "[t]he use of the word 'substantially' suggests that in the second state of circuit operation the output voltage need not be maintained precisely 'at' the regulated voltage level, but merely 'substantially at' that level." IA Review Brief 25. Therefore, the IA argues that the ID's findings that the accused products do not meet the limitation of claims 2, 3, and 34 of "substantially at the regulated voltage" are erroneous. IA Review Reply Brief 13.

"monitoring current to the load"

Linear argues that the AAT1143 and AAT1146 accused products infringe claim 35, including the limitation "monitoring current to the load." Linear Review Brief 1, Linear Review Reply Brief 2-10. Specifically, Linear argues that "monitoring a voltage that is indicative of current should be within the literal scope of Claim 35, since the claim language only requires monitoring the 'current to the load' and does not dictate a specific way of monitoring that current." Linear Review Brief 1. Specifically, Linear argues that it is "clear that the Fig. 8 embodiment operates by monitoring the instantaneous inductor current in order to monitor the current to the load," and that "monitoring the instantaneous inductor current satisfies the 'monitoring the current to the load' limitation of Claim 35 of the '258 Patent." Linear Review Reply Brief 5.

Linear argues that, based on Ohm's law (expressed as V = I x R, where V is voltage in volts, I is current in amps, and R is resistance in ohms), "if one determines the value of the voltage (V), then one also knows the value of the current (I) and vice versa," accordingly, Linear then argues that "monitoring the voltage is a precise way of monitoring the current" (Linear

Review Brief 4), and "the accused products infringe Claim 35 of the '258 Patent, because monitoring a voltage using a voltage threshold is equivalent to monitoring the current using a current threshold." Linear Review Brief 4.

AATI argues that "the accused products do not monitor 'current to the load' because instantaneous inductor current is not the same as, or indicative of, the current to the load, as Judge Harris correctly determined." AATI Review Reply Brief 66-70. AATI also argues that one of ordinary skill in the art would understand that I(fb2) in Fig. 8 represents "average inductor current" and not instantaneous inductor current. AATI Review Reply Brief 70.

With respect to the reverse current claim 35, the IA argues that monitoring instantaneous inductor current satisfies the limitation of "monitoring the current to the load," that the claim limitation is met by the embodiment shown in Figure 8 of the '258 patent which monitors current, and that, thus, the ID's conclusion that the accused products do not infringe this limitation of claim 35 is based on an improper reading of the specification. IA Review Brief 27-29, IA Review Reply Brief 14-15.

Further with respect to the reverse current claim 35, Linear argues that the AAT1143 and AAT1146 accused products meet the limitation of "monitoring current to the load" since these products have "a circuit that monitors " which "is indicative of the instantaneous inductor current." Linear Review Reply Brief 5-10. Linear also argues that the AAT1143 and AAT1146 monitor current by looking at that is directly proportional to the current and is therefore indicative of the current, and thus these products meet the limitation of claim 35 of using a current threshold. Linear Review Brief 1-5, Linear Pet. 62.

Linear further explains and expands these arguments as to the doctrine of equivalents in its response and reply to the briefing questions in the review notice. Linear Review Brief 1-5, 65-66; Linear Review Reply Brief 2-18. Linear makes the broad argument that Ohm's law (V = I x R), which states the relationship between voltage and current, means that "monitoring the voltage is a precise way of monitoring the current." Linear Review Brief 4. Linear further argues that on this basis, AAT1143 and AAT1146 infringe claim 35 "because they each have circuitry that performs the same function in substantially the same way , to accomplish the same result ." Linear Review Brief 4-5, Linear Review Reply Brief 8.

AATI argues generally that Linear has not established infringement of claim 35 of the '258 patent under the doctrine of equivalents. AATI Review Brief 2-29, AATI Review Reply Brief 6-13, 70-72. Specifically, AATI argues that Linear has failed to submit sufficient evidence and argument regarding the equivalence of the 'magnitude of the monitored current falls below a current threshold' limitation of claim 35. AATI Review Brief 6-7. AATI then argues that since the '258 patent "does not *explicitly* state whether current feedback signal I(fb2) indicates instantaneous or average inductor current, a person of ordinary skill in the art would understand that I(fb2) indicates average inductor current." AATI Review Brief 11. AATI argues that current to the load is equal to average inductor current and is quite different from instantaneous inductor current. AATI Review Brief 8-12.

AATI argues that the accused AAT1143 and AAT1146 products do not monitor current to the load or determine when that current falls below a current threshold as required by claim 35,

and instead the products monitor . AATI Review Brief 12-19. AATI provides its own doctrine of equivalents analysis and argues that the function/way/result test is not met. AATI Review Brief 15-18. More specifically, AATI argues that the function is not met since the accused products monitor indicative of instantaneous inductor current which is not the same as monitoring "current to the load." AATI Review Brief 16. AATI argues that the the way in which the accused products operate is substantially different since the accused products use a voltage comparator instead of a current comparator, and since the current threshold in claim 35 is "carefully selected" and not always the same as in the accused products. AATI Review Brief 17. Also, AATI argues that the result is substantially different since the signal resulting from the determination of the accused products (*i.e.*, from) depends on , and not on the current to the load as in claim 35. AATI Review Brief 18. Finally, AATI argues that Linear's function/way/result test (applied in Linear's Review Brief) is too broad. AATI Review Reply Brief 7-10.

AATI also makes arguments that Linear is precluded from relying on the doctrine of equivalents under the disclosure-dedication rule, based on Linear's intentional decision to use certain phrases containing the word "current," and based on the hypothetical claim rule. AATI Review Brief 19-29. Based on these additional arguments, AATI argues that "the Commission should find that Linear has failed to establish that the accused AATI products infringe claim 35 under the doctrine of equivalents." AATI Review Brief 29.

The IA argues, along lines similar to those of Linear, that the accused products meet, literally or under the doctrine of equivalents, the limitations of asserted claim 35 of monitoring

current and comparing a current with a threshold, and that although "the accused products actually monitor and trigger the second control signal when the " this "is effectively the same as monitoring the inductor current and detecting when it falls below zero." IA Review Brief 29 (emphasis added). The IA further explains and expands these arguments as to the doctrine of equivalents in his response and reply to the briefing questions. IA Review Brief 29-31, IA Review Reply Brief 15-17. Specifically, the IA argues that the '258 patent specification states that as "will be apparent to those of ordinary skill in the art . . others means of generating a feedback signal indicative of current reversal in inductor current . . . could be used as well," (IA Review Brief 30 (citing the '258 patent, column 15, lines 1-10)), and asserts that "monitoring that is indicative of current rather than monitoring current directly" is equivalent and achieves the same result. IA Review Brief 31 (emphasis added).

Parties' Positions Regarding Additional Terms Applied by ALJ in Infringement Analysis

(i) *"second circuit ..." and "third circuit ..."*

With respect to all of the asserted sleep mode claims of the '258 patent (claims 2, 3, and 34), Linear argues that there is no requirement that the second and third circuits be entirely distinct and without common circuit elements (Linear Review Brief 50-51), that the ALJ's infringement analysis "erroneously applies an extremely narrow interpretation ... which requires that every element in the second circuit be completely distinct from every element in the third circuit" (Linear Pet. 41), and that under the doctrine of equivalents the shared elements between the two circuits would not change the function or result. Linear Review Brief 65-66. Linear also

argues that "the existence of even one unique component (such as) to the third circuit should be enough to distinguish it from the second circuit." Linear Review Brief 50.

AATI argues in its response that the accused products do not have distinct second and third circuits and that the ALJ correctly interpreted the claims to require these circuits to be distinct. AATI Review Reply Brief 45-48. AATI argues that " cannot properly be considered part of any alleged third circuit because it has nothing to do with generating the alleged second control signal which is the function of the third circuit" (AATI Review Reply Brief 46), and that because the second and third circuits have different operations ascribed to them in the claims they must be distinct circuits. AATI Review Reply Brief 46-47.

Similar to Linear, the IA also seeks review of the ID's conclusion of non-infringement based on its overly narrow claim construction that erroneously precludes shared use of the same circuitry by the "second" and "third" circuits of the asserted sleep mode claims. IA Review Brief 16-19.

The IA argues that the evidence shows that each of the AAT1143, AAT1146, AAT1151, and AAT1265 accused products have the "second circuit" which generates the "first control signal" because at high load current conditions, " effectively controls the state of both switching transistors." IA Review Brief 17.

The IA argues that the AAT1143 and AAT1146 accused products have the required "third circuit" which generates the "second control signal" because at low load currents, "the

" (IA Review Brief 18), and causing the bottom transistor to be OFF as long as the

. IA Review Brief 17-18. The IA also argues that the AAT1151 accused products lack instead, but still have a second control signal. IA Review Brief 18.

(ii) *"first control signal ... second control signal"*

With respect to whether or not the accused products meet the "second control signal" limitation of the sleep mode claims, Linear asserts that are distinct and separate signals and that

. Linear Review Brief 54-60. Linear argues that "

within the AATI products is identical to the operation of the Fig. 7 embodiment disclosed in the '258 Patent." Linear Review Brief 55. Linear then graphically explains how the operation of the signals in the AATI accused products is analogous to the operation of Fig. 7. *See* Linear Review Brief 56 (chart explaining Figure 7).

AATI argues in response that the accused products do not have distinct first and second control signals (i.e., respectively), and therefore do not infringe. AATI Review Reply Brief 54-58, AATI Resp. 41-45. AATI argues that the ALJ "properly determined that the cannot satisfy the claim requirement of two distinct control signals." AATI Review Reply Brief 55.

Although the IA agrees with the ID that the are not entirely independent, the IA argues that the asserted claims do not strictly require the first and second control signals to be completely independent and distinct. IA Review Brief 21-22. The IA

"agrees with AATI that are closely related signals at high load currents" (IA Review Reply Brief 11) (emphasis added), but that by virtue of having different functionalities,

IA Review Reply Brief 12.

The IA argues that "[t]he ID does not explain, however, why the claimed 'second control signal' must be entirely independent of the 'first control signal,'" and that this aspect of the ID is based on an overly restrictive claim construction that forbids any relationship between the first and second control signals. IA Pet. 11. The IA argues that the ID took an overly narrow view of these terms of the asserted claims, that the ID incorrectly came to a conclusion of non-infringment, and that this conclusion of the ID should be reversed. IA Review Brief 21, 22.

(iii) *"a second control signal during a second state of circuit operation to cause both switching transistors to be OFF"*

Linear further asserts that the second control signal even if not directly, initiates a sequence of events that turns both transistors OFF in the sleep mode claims. Linear Review Brief 60, Linear Pet. 54-56. Linear then argues that "*but for* the accused products could not and would not turn off both switching transistors during the second state of circuit operation, and therefore is the 'second control signal' that causes 'both switching transistors to be OFF' as recited" in claims 2, 3, and 34. Linear Review Brief 60.

AATI argues that the ALJ correctly determined that the accused products do not have a second control signal that causes both transistors to be OFF. AATI Review Reply Brief 58-60. AATI Resp. 45-49. AATI argues that the second control signal in Figure 7 of the '258 patent differs fundamentally in operation from of the accused products, and that Figure 7 thus fails to show that the accused products infringe. AATI Review Reply Brief 60-61.

Similar to Linear, the IA argues that constitutes a second control signal that initiates a sequence or starts a chain of events that results in both transistors being turned OFF, that the of the accused products "ultimately causes" both transistors to be maintained OFF for a period of time, and that nothing in the claim language requires a direct or immediate result. IA Review Brief 22-23, IA Review Reply Brief 12. The IA also argues that the asserted sleep mode claims be construed to cover Figure 7 since the operation of the hysteretic comparator in Figure 7 is similar to that of . IA Review Brief 24-25, IA Review Reply Brief 12-13.

Determination

We agree with the ALJ's statement in the final ID of the general principle that whether or not the accused products infringe the asserted claims hinges on a proper claim construction. *See* ID 47. We agree with Linear with respect to the sleep mode claims (claims 2, 3, and 34) that the finding of non-infringement of the '258 patent is based on an apparently faulty claim construction. Linear Pet. 37. Based on our claim construction, we find that the accused products represented by AAT1143 infringe asserted claims 2, 3, and 34, but we do not find that the other accused products infringe these claims. We find that the AAT1143 and AAT1146 products do not infringe claim 35. Details of our views on these findings follow below.

Element-by-Element Analysis of Direct Infringement of Claims 2, 3, and 34

Because the following six disputed terms of claims 2, 3, and 34 are met by an accused product (AAT1143) under our modified claim construction, they are directly infringed. The other three accused products do not infringe these claims.

(1) "a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors" (all asserted claims)

We agree with the IA that "[t]he ID errs insofar as it seeks to confine the asserted claims to the specific type of switch control structure shown in Figure 2." IA Review Brief 15.

We agree with the ALJ that "the question of whether or not this claim limitation is satisfied by any of the accused AATI products hinges on the proper construction of this limitation." ID 47. Based on our claim construction modification, in the Claim Construction section *supra*, finding that the claims are not limited to a switch having a single unitary control circuit structure, it is our view that all of the accused products (AAT1143, AAT1146, AAT1151, AAT1265) meet this limitation since they have separate control circuitry and are configured with a single switch composed of a pair of switches (transistors).

(2) "substantially at the regulated voltage" (claims 2, 3, and 34)

With respect to the term "substantially at the regulated voltage," we agree with the IA that if Linear "intended to *require* the use of a different average output voltage during the sleep mode of operation, the patent could have been drafted so as to make that intent clear." IA Review Reply Brief 14. Because we have modified the ALJ's construction of the term "substantially at the regulated voltage" to mean that in the second state of circuit operation the voltage is maintained substantially at the regulated voltage although not ncessarily at the same voltage as in the first state of circuit operation, and because in our view, a proper construction of the claim term permits the regulated voltages in the two states of operation to be different, but does not require them to be different, it is our view that all of the accused products (AAT1143, AAT1146, AAT1151, AAT1265) meet this limitation.

Specifically, we agree with Linear that under a proper construction of this term, all of the accused products meet this limitation based on the existence of two different states of operation as shown in the output ripple graphs of AATI's product datasheets (AAT1143, CX-123C; AAT1146, CX-124C; AAT1151, CX-125C; and AAT1265, CX-118C).

(3) "first state ... operation" and "second state ... operation" (all asserted claims)

The IA states that contrary to the ID's conclusions based on Dr. Wei's testimony (AATI's expert), "the accused AATI products do have distinct states of operation that correspond to the load current level." IA Review Brief 20. As stated by the IA, "[a]t high load currents the switches of the accused AATI products operate in a complementary manner, *i.e.*, one ON, one OFF, except for deadtime," and "at low load currents the products reach a state of operation during which both transistors are OFF and the output capacitor maintains the output voltage at the regulated level." IA Review Brief 20. Thus, even if the first and second states of operation are said to correspond to high and low load current levels, respectively, we agree with Linear that the accused products (AAT1143, AAT1146, and AAT1151) meet this limitation of the sleep mode claims (claims 2, 3, and 34). Linear Review Brief 52.

Based on our determination to broaden the ALJ's construction of the terms "first state of operation" and "second state of operation" to mean that the first state of operation can be linked to high load currents, and the second state can be linked to low load currents (although the states of operation do not necessarily have to be linked to a high or low load current), it is our view that the AAT1143, AAT1146, and AAT1151 accused products meet this limitation since they have two separate states of operation, and in our view, the AAT1265 accused product does not meet

this limitation since it has not been shown to have distinct states of operation, as required by the asserted claims.

(4) "a second circuit for generating a first control signal during a first state of circuit operation" and "a third circuit for generating a second control signal during a second state of circuit operation" (claims 2, 3, and 35)

We do not agree with the ALJ's interpretation of claims 1-3 and 34 as requiring the second and third circuit to be separate and distinct with no overlapping circuit elements. Further, we do not agree that "portions" of the language of claim 34 "correspond" to that of claim 1. In other words, the ALJ appears to have erred in interpreting claim 34 as requiring second and third circuits and first and second control signals. Although asserted claim 35 contains these limitations, asserted claim 34 is a method claim and simply does not contain the limitations of "a second circuit for generating a first control signal during a first state of circuit operation" and "a third circuit for generating a second control signal during a second state of circuit operation."

We agree with Linear and the IA that the ALJ seems to have too narrowly construed the asserted claims as requiring that the "second" and "third" circuits be entirely distinct and without common circuit elements, that every element in the second circuit be completely distinct from every element in the third circuit, and as precluding shared use of the same circuitry by the "second" and "third" circuits of the asserted sleep mode claims. We agree that even a difference such as having an additional can cause the circuits to be different and distinct in their topology and their operation.

We agree with the IA that each of the AAT1143, AAT1146, AAT1151, and AAT1265 accused products have the "second circuit" which generates the "first control signal" because at

high load current conditions,

IA Review Brief 17.

We also agree with the IA that the AAT1143 accused product has the required "third circuit" which generates the "second control signal" because at low load currents,

(IA Review Brief 18), and causing the bottom transistor to be OFF as long as

. IA Review Brief 17-18.

Although the IA argues that "[t]he AAT1146 is similar to the AAT1143 in all patent-relevant aspects" (IA Review Brief 18), we note that the schematics and datasheets of the AAT1143 and AAT1146 show differences in circuit logic and output characteristics (*compare* CX-115C at p. 10 (AAT1143 schematic) and CX-123C at pp. 1, 8 (AAT1143 datasheet) *with* CX-116C at p. 10 (AAT1146 schematic) and CX-124C at pp. 1, 9 (AAT1146 datasheet)). In our view, there is not sufficient record evidence to support a finding that this claim limitation is met with regard to the AAT1146, especially since neither Dr. Wei (AATI's expert) nor Dr. Pedrom (Linear's expert) testified with specificity regarding whether or not the AAT1146 actually functions the same as the AAT1143, and Linear has not argued with specificity that the AAT1146 meets this limitation (instead Linear argues generally that all of the accused products meet all of the claim limitations). The majority of Linear's briefs are drawn to discussion of the AAT1143 in relation to the limitations of the asserted claims.

We agree with the IA that the AAT1151 and AAT1265 differ from the AAT1143 in that they lack a . IA Review Brief 18, 19 at fn. 11. In our view, the presence of

in the AAT1143 represents a concrete physical difference in circuitry between the second and third circuits, and this distinction is not present in the AAT1151 or AAT1265. Thus, the AAT1151 and AAT1265 accused products do not meet the "third circuit" limitation since they lack which would distinguish a third circuit from the second circuit. Thus, the AAT1146, AAT1151, and AAT1265 do not meet the "third circuit" limitation required by asserted claims 2 and 3.

Based on our construction of this term, and the above discussion, it is our view that only the AAT1143 accused product meets both of the limitations of a second and third circuit.

(5) "first control signal ... second control signal" (claims 2, 3, and 35)

We agree with Linear that are distinct and separate signals corresponding to the first and second control signals, and that . We also agree with the IA that the asserted claims do not strictly require the first and second control signals to be completely independent and distinct as required by the ALJ in the ID. As provided above with respect to the "second circuit" and "third circuit," all of the accused products have a which meets the "first control signal" limitation, but in our view only the AAT1143 meets the "second control signal" limitation. We agree with the IA that the AAT1143 meets both limitations since the AAT1143 has the , which correspond to the first and second control signals respectively, and since of the AAT1143 operates in combination with (*i.e.*, second control) signal from (*i.e.*, first control) signal. IA Review Brief 22.

However, in our view, the other three products do not meet the "second control signal" limitation. Specifically, we do not agree with the IA that (i) the AAT1151 product's corresponds to and operates the same as (IA Review Brief 18, 22), or that (ii) the AAT1265 product's corresponds to and operates the same as . IA Review Brief 18. In our view, the AAT1151 and AAT1265 accused products do not meet this limitation since neither accused product has been shown to have distinct first and second control signals (*i.e.*, no to distinguish the two signals from each other), as required by the asserted claims.

In addition, the AAT1146 does not meet this limitation since neither Dr. Wei (AATI's expert) nor Dr. Pedrom (Linear's expert) testified with specificity regarding whether or not the AAT1146 (or the AAT1151 or AAT1265) actually functions the same as the AAT1143, since Linear has not argued that with specificity that the AAT1146 (or the AAT1151 or AAT1265) meets this limitation (instead Linear argues generally that all of the accused products meet all of the claim limitations), and since Linear has not sufficiently shown that the AAT1146 (or the AAT1151 or AAT1265) generates the "second control signal" which causes both switching transistors to be OFF for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage, as required by asserted claims 2 and 3.

Based on our claim construction, in the Claim Construction section *supra*, it is our view that only the AAT1143 meets this limitation since the signals in the accused products constitute two distinct signals as claimed.

(6) "a second control signal during a second state of circuit operation to cause both switching transistors to be OFF" (claims 2 and 3)

We agree with the IA that the ID applies an overly narrow construction of "a second control signal ... to cause both switching transistors to be OFF," and that the ALJ does not explain in the ID why this limitation cannot be satisfied by a signal "that starts a chain of events that ultimately results in both transistors being maintained OFF." IA Pet. 13. In other words, it is our view that this claim limitation is broad enough to cover a signal which causes, or ultimately results in, both switching transistors being OFF. In our view, the plain language of the claim does not provide any time restriction or requirement of immediate or direct connection between the second control signal and the turning OFF of the two transistors.

We agree with Linear and the IA that the of the AAT1143 causes the bottom transistor to turn OFF and meets the limitation of "a second control signal ... to cause both switching transistors to be OFF."

Since we do not agree with the IA that the AAT1151 product's corresponds to (IA Review Brief 18, 22), and because the AAT1151 thus does not have a distinct "second control signal," it is our view that the AAT1151 does not meet the "second control signal during a second state of circuit operation to cause both switching transistors to be OFF" limitation. Likewise, since we do not agree with the IA that the of the AAT1265 corresponds to (IA Review Brief 18), and the AAT1265 thus does not have a distinct "second control signal," it is our view that the AAT1265 does not meet the "second control signal during a second state of circuit operation to cause both switching transistors to be OFF" limitation. In our view, Linear has not adequately shown that

this limitation is met by the AAT1151 or AAT1265 accused products.

With regard to the AAT1146, it is our view that Linear has not adequately demonstrated that the AAT1146 meets the limitation of a "second control signal" for reasons given *supra*, due to differences in the schematics and datasheets of the AAT1143 and AAT1146. In our view there is not sufficient record evidence to support a finding that this claim limitation is met with regard to the AAT1146.

Accordingly, it is our view that only the AAT1143 accused product includes every disputed element of the sleep mode claims (claims 2, 3, and 34). Therefore, we determine that the sleep mode claims are infringed by the AAT1143 and reverse the ID in this respect.[3]

Infringement of Claim 35, Literally or Under the Doctrine of Equivalents

The ALJ found that none of the accused products infringed claim 35, the reverse current claim, literally or under the doctrine of equivalents. ID at 59-63. Linear contests this finding and argues that the AAT1143 and AAT1146 products infringe claim 35. Claim 35 includes several terms, "monitoring the current to the load," "monitoring the current," and "current threshold" which are not found in the sleep mode claims.

It is our view that the features of the accused products of monitoring a voltage using a voltage threshold do not meet the limitations of "monitoring the current to the load" or "monitoring the current" using a "current threshold", literally or by equivalents. We do not agree with Linear that, based on Ohm's law, "monitoring the voltage is a precise way of monitoring the

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[3] Linear's cursory arguments on infringement of the sleep mode claims under the doctrine of equivalents are either based on a claim construction we have not adopted or are unsupported or both.

current." Linear Review Brief 4. Use of Ohm's law would require another element, a known resistance, in order to calculate current from .

Instead, we generally agree with AATI that using is not the same as using a current threshold, and that thus the accused products were properly found by the ALJ not to infringe claim 35 since the accused products monitor a voltage and use instead of a current threshold. AATI Review Brief 2-29, AATI Review Reply Brief 6-13, 70-72. Thus, we find no literal infringement of claim 35.

With respect to the doctrine of equivalents, it is our view that, although the accused products may perform the same function and result as recited in claim 35 (*i.e.*, "to cause one said switching transistors to be maintained OFF," at column 20, lines 11-12 of the '258 patent), they do not perform that function in substantially the same way (*i.e.*, by "monitoring current to the load" and perfoming the function/result "when the magnitude of the monitored current falls below a current threshold." at column 20, lines 9 and 12-14). The claim language in the last paragraph of claim 35, "monitoring current to the load," is inextricably tied to the claim language "when the magnitude of the monitored current falls below a current threshold." While these terms taken individually and separately could be argued to leave open the possibility that the third circuit could be equivalent by monitoring using a voltage instead of a current, the existence of a second claim term specifically defining *how* the current is monitored (*i.e.*, "when the magnitude of the monitored current falls below a current threshold") militates against such a construction. Furthermore, when these terms are read together in the same paragraph they operate in combination to provide a clear function and to describe specifically how that function is performed.

In our view, Linear and the IA have not sufficiently shown that the features of the accused products of monitoring meet the limitations of claim 35 of "monitoring the current" using a "current threshold," either literally or by equivalents. The difference between monitoring current versus voltage and using a current instead of a voltage threshold is not insubstantial in this case. Accordingly, we determine that the features of the accused products of monitoring do not meet the subject limitation under the doctrine of equivalents. We thus determine that claim 35 is not directly infringed, either literally or under the doctrine of equivalents.

Summary of Infringement

For the foregoing reasons, based on our claim construction, we determine to reverse-in-part the ALJ's conclusions on infringement of the '258 patent in the ID. With respect to the sleep mode claims (asserted claims 2, 3, and 34), we (i) reverse the ALJ's finding of no literal infringement, but only with respect to representative product AAT1143, and (ii) affirm the ALJ's finding of no infringement by representative products AAT1146, AAT1151, or AAT1265. With respect to the reverse current claim (asserted claim 35), we affirm the ALJ's findings of no direct infringement (literal or under the doctrine of equivalents). We do not reach the issue of indirect infringement with respect to any of the claims.

C. Validity

1. Applicable Law

A patent is presumed valid. 35 U.S.C. § 282. The burden of showing invalidity is on the challenger, who must do so by clear and convincing evidence. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1375 (Fed. Cir. 1986). Further, as stated by the Federal Circuit

in *Ultra-Tex Surfaces, Inc. v. Hill Bros. Chem. Co.*, 204 F.3d 1360, 1367 (Fed. Cir. 2000) (emphasis added in italics), "when a party alleges that a claim is invalid based on *the very same references* that were before the examiner when the claim was allowed, that party assumes the following additional burden:"

> When no prior art other than that which was considered by the PTO examiner is relied on by the attacker, he has the added burden of overcoming the deference that is due to a qualified government agency presumed to have properly done its job, which includes one or more examiners who are assumed to have some expertise in interpreting the references and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents. *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir. 1984).

One ground for invalidity is anticipation of the claimed invention, and another ground is obviousness of the claimed invention.

A determination that a patent is invalid as being anticipated under 35 U.S.C. § 102 requires a finding that each and every limitation is found either expressly or inherently in a single prior art reference. *See State Contracting and Eng'g Corp. v. Condotte Am., Inc.*, 346 F.3d 1057, 1068 (Fed. Cir. 2003); *Celeritas Techs. Inc. v. Rockwell Int'l Corp.*, 150 F.3d 1354, 1360 (Fed. Cir. 1998).

A determination that a patent is invalid for obviousness under 35 U.S.C. § 103 requires a finding that "the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a). A conclusion of obviousness hinges on four factual findings set forth in *Graham v. John Deere Co.*, 383 U.S. 1 (1966): (1) the scope and content of the prior art; (2) the differences between the prior art and the claims; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness such as

commercial success, long felt but unsolved needs, or the failure of others. *Id.* at 13-17.

Obviousness is a conclusion of law based on the underlying factual findings which are the result of the foregoing inquiry. *In re Vaeck*, 947 F.2d 488, 493 (Fed. Cir. 1991). The Supreme Court has recently addressed obviousness in *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007). While confirming the applicability of the four factors in *Graham v. John Deere Co.*, the Supreme Court criticized the Federal Circuit's "teaching, suggestion, or motivation" (TSM) test, under which a patent claim is only shown to be invalid for obviousness if the prior art, the problem's nature, or the knowledge of a person having ordinary skill in the art reveals some motivation or suggestion to combine the prior art teachings. *KSR Int'l Co.*, 127 S. Ct. at 1742-43. The Supreme Court warned against rigid application of the TSM test: "Rigid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it." *Id.* The Supreme Court also stated in *KSR Int'l Co.* that the fact that a combination was obvious to try might show that it was obvious under § 103. *Id.* at 1742.

2. Discussion

The ALJ's ID

The ALJ determined that asserted claims 2, 3, and 34 (*i.e.*, the sleep mode claims) are valid and that asserted claim 35 (*i.e.*, the reverse current claim) is invalid due to anticipation by the MAX782 reference under § 102(a). ID 81, 86.

In addressing the validity of the '258 patent in his ID, the ALJ considered the following challenges to validity: (1) anticipation or obviousness of all asserted claims by

various combinations of the Siliconix Si9150, Linear Application Note 35 ("LAN35"), Linear Application Note 19 ("LAN19"), and prior art Figure 1 of the '258 patent (ID 78-81); (2) anticipation of the reverse current claim 35 by the MAX782 Evaluation Board (ID 81-86); (3) anticipation of claim 35 by the Ron Vinsant Laptop Switcher Proposal (ID 87-88); (4) anticipation of claim 35 by the ML4861 Datasheet (ID 88-89); (5) anticipation of all asserted claims by the Ziermann patent (U.S. Pat. No. 5,237,606) (ID 89-90); (6) obviousness of claim 35 in view of the MAX782 and ML4861; and (7) double patenting with respect to U.S. Patent No. 6,304,606. ID 91.

The ALJ rejected all of these arguments except for (2), anticipation of claim 35 by the MAX782 Evaluation Board under § 102(a). ID 73-91. The ALJ noted in the ID that there was no dispute among the parties that the MAX782 met all of the limitations of claim 35 (ID 82), but that there was a dispute as to the invention date (*i.e.*, conception and reduction to practice) of the '258 patent which would affect the availability of the MAX782 as prior art. ID 82-84. The ALJ determined that Linear did not have an invention date for the invention of claim 35 before the sale and distribution date of the MAX782 (prior to March 23, 1993, the effective U.S. filing date), including the feature of including a circuit for monitoring the current. ID 85. The ALJ determined in the ID that "[i]t has been shown by clear and convincing evidence that claim 35 of the '258 patent is invalid due to anticipation by the MAX782 Evaluation Board" and that "[n]o other claim of the [sic]['258] patent has been shown by clear and convincing evidence to be invalid." ID 91.

Linear's Position

Linear argues that AATI bears a heightened burden to show invalidity since the very same references (i.e., Siliconix Si9150, LAN35, LAN19, and prior art Figure 1 of the '258 patent) were before the examiner during the prosecution of the '258 patent. Linear Review Brief 29. Linear argues that AATI has not shown by clear and convincing evidence that the asserted sleep mode claims are anticipated by LAN35 (Linear Review Brief 29-34), that LAN35 discloses an asynchronous switching regulator which does not have two transistors as required by the asserted claims (Linear Review Brief 31-34), that the asserted claims of the '258 patent are not obvious in view of LAN35 combined with Figure 1 of the '258 patent (Linear Review Brief 40-43), and that the asserted claims of the '258 patent are not obvious in view of LAN35 combined with LAN19. Linear Review Brief 43-45. Linear also argues that secondary considerations such as failure of others, solution of a long-standing problem, and commercial success provide compelling proof of nonobviousness. Linear Review Brief 45-48.

Linear argues that the MAX782 fails to anticipate claim 35 of the '258 patent (Linear Review Brief 34-37), and that the European prosecution history should not be considered in determining the validity of the MAX782. Linear Review Brief 36-37. Specifically, Linear argues that conception occurred as early as February of 1991 (Linear Review Brief 34-35), and that inventor Wilcox's notebook drawings which show

meet the limitation of claim 35 of monitoring current. Linear Review Brief 35. Linear also argues that public statements of Maxim's CEO concerning a license Maxim took to the '258 patents contradicts anticipation by the MAX782. Linear Review

Brief 34-35.

AATI's Position

AATI argues that the ALJ correctly determined that claim 35 is invalid based on the MAX782. AATI Review Reply Brief 74. AATI requests review with respect to the validity of asserted claims 2, 3, and 34 (the sleep mode claims), should the Commission review and broaden the claim construction in the ID. AATI 74-93. AATI argues that, as discussed in its petition (AATI Pet. 3- 4), if the Commission were to adopt a broader claim construction, a number of validity issues would arise which the ALJ did not reach. AATI Review Reply Brief 79. Specifically, AATI argues that the Commission should consider whether the sleep mode claims were: (1) anticipated by LAN35 (AATI Review Reply Brief 79-83), (2) obvious in view of LAN35 alone or in combination with LAN19 (AATI Review Reply Brief 84-88), and (3) obvious in view of the admitted prior art of Figure 1 of the '258 patent in combination with LAN35. AATI Review Reply Brief 88-93. As AATI states in its petition, and we do not disagree, "[i]t is axiomatic that claims must be construed consistently for asserting both infringement and validity." AATI Pet. 4 (citing *Amgen Inc. v. Hoescht Marion Roussel Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003)).

AATI argues that the ALJ properly found asserted claim 35 to be invalid due to anticipation by the MAX782. AATI Review Reply Brief 74-79, AATI Resp. 64-73. AATI asserts that Linear has not shown conception and reduction to practice of the "monitoring current" limitation of asserted claim 35 by clear and convincing evidence (AATI Review Reply Brief 75, AATI Resp. 68-70), and that the ALJ correctly

determined that Linear was not entitled to an invention date earlier than the March 23, 1993, the effective U.S. filing date of the '258 patent. AATI Review Reply Brief 75, AATI Resp. 65, 68.

AATI also argues that "Linear failed to establish an earlier conception date for claim 35 because all of the documents that Linear relies upon utilize circuits that monitor the voltage across a timing capacitor rather than monitoring the current to the load as required by claim 35." AATI Review Reply Brief 75. AATI argues that "Linear's statements to the European Patent Office ("EPO") during prosecution of the counterpart related to the '258 patent confirms that the timing-capacitor design does not 'monitor current to the load.'" AATI Review Reply Brief 76. Lastly, AATI argues that the public statement of Mr. Gifford, Maxim's CEO (that Maxim settled the *Impala* litigation and took a license to Linear's patents because there was not any prior art that was that strong), "sheds no light on the validity of claim 35 of the '258 patent." AATI Review Reply Brief 78.

The IA's Position

The IA does not dispute the ID's findings as to the validity of claims 2, 3, and 34, or the invalidity of claim 35. IA Review Reply Brief 19-22, IA Pet. 1.

In response to AATI's arguments of invalidity based on LAN35 either alone or in combination with other references (AATI Review Reply Brief 79-93, AATI Pet. Resp. 73-100), the IA argues that LAN35 uses an asynchronous device with one transistor having a different type of duty cycle control and that additional nonobvious circuitry would be needed to achieve the asserted claims. IA Review Reply Brief 22. The IA also

argues that since strong objective evidence of nonobviousness such as commercial success exists, LAN35 does not render the asserted sleep mode claims (claims 2, 3, and 34) obvious. IA Review Reply Brief 22.

In response to Linear's arguments that MAX782 does not anticipate claim 35 (Linear Review Brief 34-37), the IA argues that even if Linear has proven conception back to February 1991 (before the 1993 date of MAX782), Linear has not met its burden of proving either a prior reduction to practice or the required diligence. IA Review Reply Brief 19-21.

In response to Linear's arguments that the statements of Maxim's CEO Jack Gifford concerning their licensing of the '258 patent (that "there wasn't any prior art that was strong" and that) preclude a finding of anticipation of claim 35 (Linear Review Brief 35-36), the IA argues that the statement was broadly directed to the entire '258 patent (including sleep mode claims and the reverse current claim) and it is possible that the statement applied to only the sleep mode claims and not the reverse current claim. IA Review Reply Brief 21. Thus, the possibility exists, the IA argues, that Maxim settled in reponse to the existence of prior art to the sleep mode claims and not the reverse current claim, and that the MAX782 still constitutes invalidating prior art as to claim 35. IA Review Reply Brief 21 (citing *Gemstar-TV Guide Int'l, Inc. v. U.S. Int'l Trade Comm'n*, 383 F.3d 1352, 1381 (Fed. Cir. 2004) (standing for the proposition that inventorship is determined on a claim-by-claim basis)).

Determination

We agree that it may be more difficult for AATI to meet its burden of showing invalidity in light of the fact that during the prosecution of the '258 patent the examiner had the LAN35, LAN19, and Figure 1 prior art before him. *See Ultra-Tex Surfaces*, 204 F.3d at 1367. Linear Review Brief 29; Linear Pet. Resp. 5-6, 26. We also agree with the IA with respect to the validity of claims 2, 3, and 34. IA Review Reply Brief 22, IA Pet. 1. In our view, AATI's validity challenges (based on the LAN35, LAN19, etc.) do not provide clear and convincing evidence that these asserted claims are invalid, taking into account our broader claim construction.

As to claims 2, 3, and 34, with respect to AATI's validity argument based on LAN35 and various combinations of LAN35, we agree with Linear and the IA that LAN35 is an asynchronous switching voltage regulator as opposed to a synchronous switching voltage regulator, and that LAN35 therefore does not disclose the second switching transistor required by the asserted claims. Linear Review Brief 31-33, IA Review Reply Brief 22. We find this significant, since asynchronous and synchronous switching regulators vary the power switch duty cycle in very different ways (*e.g.*, asynchronous switching regulators are not as efficient at low load current as synchronous switching regulators). *See* RX-619C at 11. Furthermore, the control circuitry for synchronous regulators is much more complex than that of asynchronous regulators due to having to provide circuitry for driving a second transistor and due to having to include circuitry to include brief deadtimes during switching (*i.e.*, where both transistors are turned OFF) to make sure that the two transistors do not cross-conduct (a condition where

current flows from the battery or voltage source and through the two transistors to ground, instead of to the load). *See* RX-619C at 10. In our opinion, an asynchronous switching regulator having a single transistor and a diode fails to anticipate or meet the limitation of the asserted claims of a pair of synchronous switching transistors. Thus, it is our view that LAN35 cannot anticipate claims 2, 3, and 34.

Likewise, we agree with Linear that due to the significant differences in circuitry between asynchronous and synchronous switching regulators, discussed *supra*, it would not have been obvious to one of ordinary skill in the art at the time of the '258 patent to have substituted a pair of transistors for the transistor and diode of LAN35 to achieve the claimed invention. Linear Review Brief 40-45, Linear Resp. 9.

With respect to the combination of LAN35 with LAN19, we agree with Linear that LAN19 discloses replacing a transistor with a diode, which is exactly opposite and actually teaches away from what AATI asserts LAN19 stands for - the proposition that it would have been obvious to modify LAN35's asynchronous switching regulator by replacing the diode with a second transistor to create a synchronous switching regulator. Linear Pet. Resp. 19. In other words, LAN19 discloses replacing transistors with diodes but not replacing diodes with transistors.

With respect to the combination of LAN35 with the Figure 1 prior art, we agree with Linear that it would not have been obvious to one of ordinary skill in the art to combine the circuitry of these vastly different types of switching regulators (*i.e.*, the asynchronous switching regulator of the LAN35 and the synchronous switching regulator of the Figure 1 prior art). Linear Review Brief 40-43. Even if one of ordinary skill in the

art would be motivated to combine the on/off transistor control circuitry of the LAN35 (assumedly for the top transistor, since LAN35 has no bottom transistor) with the synchronous switching regulator of the Figure 1 prior art as suggested by AATI (AATI Review Reply Brief 89), the resultant regulator would still not meet the limitation of claim 35 of a "third circuit for generating a second control signal during a second state of circuit operation to cause both switching transistors to be OFF for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage." This important sleep mode aspect of the asserted claims of the '258 patent is neither taught nor suggested by the on/off circuitry from the Figure 1 prior art, by the asynchronous regulator of the LAN35, or in any possible combination thereof.

We agree with AATI and the IA with regard to the invalidity of claim 35. In our view, a circuit that monitors voltage does not meet the requirement of claim 35 of monitoring current, and the ALJ correctly determined that claim 35 of the '258 patent does not have an invention date prior to March 23, 1993 (the effective U.S. filing date of the '258 patent). We agree with the IA that Linear has not established that the breadboard circuit tested in August 1991 constitutes a reduction to practice of claim 35 which requires "monitoring the current to the load" to generate a control signal when the monitored current falls below the "current threshold." IA Review Reply Brief 20-21. "In order to establish actual reduction to practice, the inventor must prove that he constructed an embodiment . . . that met *all* the limitations of the claim." *Slip Track Systems, Inc. v. Metal-Lite, Inc.*, 304 F.3d 1256, 1265 (Fed. Cir. 2002) (emphasis added). Linear has at best established reduction to practice of a circuit that

. Accordingly, we agree with AATI and the IA that the MAX782 is prior art to the '258 patent under § 102(a).

We are not persuaded by Linear's argument that the ALJ incorrectly considered the European prosecution history in interpreting the scope of the '258 patent as limited to a comparator which monitors current and compares one current to another as disclosed in Fig. 8 of the '258 patent. Linear Review Brief 36-37. To the contrary, in our view, the European prosecution history is quite relevant to the validity issues concerning reverse current claim 35 of the '258 patent since the European claim in question was directed to a circuit which compared a "current" to a threshold to determine "reverse polarity" in a voltage regulator. Thus, we agree with AATI that the ALJ properly considered the European prosecution history.

For the aforementioned reasons, based on our claim construction, we affirm the ALJ's findings of validity of claims 2, 3, and 34 of the '258 patent, and of invalidity with respect to claim 35 of the '258 patent.

D. Remedy, Public Interest, and Bonding

We find on the record before us, that a violation of section 337 with respect to claims 2, 3, and 34 of the '258 patent has occurred. For the reasons discussed below, we determine that (1) a limited exclusion order excluding from entry AATI products (but not downstream products) that infringe claims 2, 3, and 34 of the '258 patent is the appropriate remedy in this case, (2) the order shall not extend to downstream products containing infringing articles, (3) such an order is not precluded by consideration of the public interest factors, and (4) the bond for importation during the Presidential review

period should be 100 percent of the entered value of the articles concerned.

The ALJ's RD

The ALJ recommended that, if the Commission determines there has been a violation of section 337 of either or both of the '258 patent and the '531 patent, a limited exclusion order covering all accused devices and any downstream products manufactured by AATI, and cell phones manufactured by third parties that contain the accused devices, is the appropriate remedy. RD 3-6.

Regarding downstream products, the ALJ stated that "[a]lthough the record indicates that AATI rarely if ever imports products containing such devices, any downstream AATI products that might exist should also be covered by the order." RD 4. He then addressed the question of downstream products of third parties, noting that "almost all sales of accused devices (voltage regulators and charge pumps) occur overseas." RD 4. He reasoned that an exclusion order against only AATI accused devices might be ineffective if the accused devices could be imported as a component of other products. RD 4. Therefore, the ALJ reviewed the *EPROMs* factors to determine if downstream products containing the accused devices should be subject to an exclusion order. RD 4-6; s*ee Certain Erasable Programmable Read-Only Memories, Components Thereof, Products Containing Such Memories, and Process for Making Such Memories*, Inv. No. 337-TA-276, Commission Opinion at 125-26 (May 1989) ("*EPROMs*").

From the record evidence presented, the ALJ found that "the vast majority if not all sales of accused AATI devices are made to third parties located outside the United States" (RD 5-6), and determined that since almost all AATI accused devices enter the

U.S. by being imported in downstream products, any exclusion order without downstream relief would be meaningless. RD 4, 5-6. He noted, however, that "the record contains little evidence of the types of imported products that actually contain accused devices, except for cellular telephones." RD 6. Therefore, the ALJ recommended that any exclusion order should be directed to all accused devices and any downstream products manufactured by AATI, as well as cell phones manufactured by third parties that contain the accused devices. RD 6.

The ALJ did not recommend that the Commission issue a cease and desist order because although it was not disputed that AATI has imported some accused devices into the United States, "Linear has not shown that AATI maintains any commercially significant domestic inventory of the devices." RD 7.

Regarding bonding, the ALJ reviewed Commission precedent on the amount of the bond to be posted pursuant to section 337(j)(3) during the 60-day Presidential review period. RD 7-8. According to that precedent, when reliable price information is available, the Commission often sets the bond based on the price differential. RD 7. However, he also noted that when such a comparison could not be made, the Commission has set the bond at 100 percent of entered value. RD 7-8. He noted that while there was record evidence of "wide price differentials between Linear and AATI products," as well as smaller differentials, "it is not possible to calculate the difference between Linear and AATI prices." RD 8. The ALJ also found that "there is no clear evidence relating to a reasonable royalty." *Id.* Based on these findings, and to insure that Linear is protected from injury, the ALJ recommended that the temporary importation bond be set at 100

percent of entered value. *Id.*

Parties' Submissions

As noted above, the Commission requested written submissions from the parties relating to the appropriate remedy, whether the statutory public interest factors preclude issuance of that remedy, and the amount of bond to be imposed during the Presidential review period. The Commission also directed AATI and the IA to submit proposed remedial orders. Additionally, third party LG made written submissions concerning the scope of the remedy.

Linear's Position

Linear argues that the Commission should issue a limited exclusion order that excludes not only AATI's own products, but also other downstream products incorporating the infringing AATI devices such as "cellular telephones, wireless LAN cards, and laptops." Linear Remedy Brief 1, Linear Remedy Reply Brief 4. Linear also requests a certification provision permitting AATI's third party customers to certify that their products do not contain infringing products. *Id.*

Linear contends that an *EPROMs* factors analysis demonstrates that downstream product relief is appropriate and necessary. Linear Remedy Reply Brief 4-14. Linear argues that the facts of this case closely resemble those in *Certain Baseband Processor Chips and Chipsets, Transmitter and Receiver (Radio) Chips, Power Control Chips, and Products Containing Same, Including Cellular Telephone Handsets*, Inv. No. 337-TA-543 (June 19, 2007) ("*Baseband Processor Chips*") and *Certain Display Controllers with Upscaling Functionality and Products Containing Same*, Inv. No. 337-TA-481, Comm'n

Op. (Aug. 30, 2004) ("*Display Controllers*"), and favors issuance of a limited exclusion order extending to downstream products since absent such an order Linear "would effectively receive no relief at all because there was virtually no importation of the accused products outside of downstream products." Linear Remedy Brief 7-8. Linear discusses each *EPROMs* factor and contends that each factor either does not preclude or weighs in favor of issuing a limited exclusion order covering infringing AATI products as well as any downstream products containing the same. Linear Remedy Brief 5-17, Linear Remedy Reply Brief 14-22.

Linear also requests a cease and desist order. Linear Remedy Brief 17-18, Linear Remedy Reply Brief 22. Specifically, Linear argues that AATI maintains an inventory of voltage regulators for testing as well as demonstration boards incorporating such in its facilities in Sunnyvale, California. Linear Remedy Reply Brief 22.

With regard to the public interest, Linear argues that there is no evidence that U.S. consumers will be adversely impacted by any exclusion order, that an exclusion order would not adversely affect the U.S. economy, and that a number of other manufacturers exist which produce non-infringing circuits for sale to third parties potentially impacted by any exclusion order. Linear Remedy Brief 18-19. Linear also argues that to deny relief here would adversely affect the marketplace by discouraging investment in the development of technological innovations. Linear Remedy Brief 19. Linear argues that there is no evidence to support AATI's argument that the exclusion order would adversely affect the development of advanced semiconductor technology or adversely affect consumer model choice in the U.S. market. Linear Remedy Reply Brief 23.

Linear agrees with the ALJ's recommendation in the RD that the bond should be set at 100 percent of the entered value. Linear Remedy Brief 19, Linear Remedy Reply Brief 23-24. Linear argues against AATI's suggested bond rate of 30 or 40 percent. Linear Remedy Reply Brief 24; *see also* AATI Review Brief 60.

AATI's Position

AATI argues that the record does not support Linear's request for a broad exclusion order that would cover downstream products. AATI Review Brief 34-58. Generally, AATI asserts an exclusion order covering a number of downstream products in addition to AATI infringing voltage regulators is burdensome and impractical based on the evidence of record. AATI Review Reply Brief 93-95. AATI argues that Linear has mischaracterized the evidence relating to remedy and that "there is no evidence in the record" "that any manufacturer of downstream products imports even a single product model into the United States that incorporates an accused AATI switching regulator device." AATI Review Reply Brief 95-97, *see also* AATI Review Reply Brief 34-38.

AATI generally argues that the balance of all of the *EPROMs* factors weighs against issuing a downstream remedy. AATI Review Reply Brief 97-105, AATI Review Brief 42-57. AATI further argues that Linear's proposed limited exclusion order would "encompass and unduly burden legitimate commerce in an enormous variety of unaccused and noninfringing products," and that other than requiring a higher bond than necessary (100 percent instead of AATI's recommended 40 percent of entered value of the accused devices), "OUII's proposed limited exclusion order is a more appropriate and narrowly-tailored order, which conforms to the proof Linear sought in discovery and

presented at the final hearing." AATI Review Reply Brief 107-08.

AATI argues that Linear has not met its burden of proving that AATI has a "commercially significant" inventory of infringing products in the United States as required by *Baseband Processor Chips*, that there is not sufficient evidence to support such a finding, and that therefore no cease and desist order should issue. AATI Review Reply Brief 106, AATI Review Brief 58-59.

AATI argues that the public interest would be adversely impacted by issuance of a limited exclusion order reaching downstream products. AATI Review Reply Brief 105. Specifically, AATI argues that including downstream products would have an adverse effect on advanced semiconductor technology development as well as U.S. consumer choice of consumer electronics models in the U.S. market. AATI Review Reply Brief 105.

Regarding bonding, AATI argues that the ALJ's recommendation in the RD of a 100 percent bond, which makes no distinction between bond amount for directly imported infringing AATI voltage regulators and downstream products containing them, is inappropriate. AATI Review Brief 59-60. AATI argues in its brief that the appropriate bond for accused AATI voltage regulators is 30 or 40 percent. AATI Review Brief 60. AATI also argues in its brief that based on the selling price of accused AATI products, "the appropriate bond amount for any downstream product included in a limited exclusion order is 1% of entered value." AATI Review Brief 61. AATI argues in its reply brief that the appropriate bond amount for accused switching regulator devices should be set at 40 percent for imported, infringing devices and at one percent for

downstream products. AATI Review Reply Brief 107.

Third Party LG's Position

LG asserts that none of its imported products, including cell phones, use the AATI voltage regulators accused of infringing the '258 patent, and that Linear's accusations are based on AATI's charge pumps (the subject of the '531 patent). LG Remedy Brief 2-4, LG Remedy Reply Brief 2-6. LG argues that "LG's use of AATI's charge pumps is irrelevant to any remedy" "because the charge pumps are not covered by Linear's '258 patent." LG Remedy Reply Brief 4. LG argues that any exclusion order that may issue in this case should not cover LG's products (LG Remedy Brief 6), and if issued "such an order should exempt LG products, including cell phones, that are imported in the United States, sold for importation, or sold in the United States after importation." LG Remedy Brief 6.

LG argues that the *EPROMs* analysis is irrelevant to LG's downstream products since "LG's downstream products in the United States do not contain AATI's accused switching voltage regulators" and thus fall squarely in the category of "legitimate commerce" which should not be interfered with. LG Remedy Reply Brief 6 (citing *Certain Audio Processing Integrated Circuits, And Products Containing Same*, Inv. No. 337-TA-538, Final Initial and Recommended Determination (March 20, 2006)). LG argues that "[e]ven if the *EPROMs* factors were to be considered, they would uniformly weigh against including LG's downstream products in the exclusion order." LG Remedy Reply Brief 7-9, *see also* LG Remedy Brief 4-5. Lastly, LG argues that a certification provision is no substitute for proof that infringing products have been imported, and the

Commission has previously refused to issue downstream relief where there was insufficient specific evidence of infringing downstream products entering the United States. LG Remedy Reply Brief 11-12 (citing *High-Brightness LEDs and Products Containing Same*, Inv. No. 337-TA-556, Comm'n Op. 27-28 (May 31, 2007)).

With regard to the public interest, LG argues that the public welfare, competitive conditions in the U.S. economy, employment, lower prices, and wider product choices do not warrant excluding LG's cell phones and other non-infringing downstream products from the scope of remedy. LG Remedy Brief 5-6.

In summary, LG argues that it "agrees with the Commission investigative attorney and AATI that the Commission should not issue an exclusion order that covers downstream products, particularly those products being imported or sold in the United States by LG, since LG's products do not contain the accused switching voltage regulators." LG Remedy Reply Brief 12. LG presents no arguments with respect to bonding in either its brief or reply brief.

The IA's Position

Generally, the IA argues that a limited exclusion order directed to AATI's voltage regulators and applying a 100 percent bond is appropriate. IA Review Reply Brief 23-27. However, the IA disagrees with Linear with respect to downstream products, and "does not support the extension of the exclusion order to downstream products containing the infringing voltage regulators." IA Review Brief 34. Specifically, the IA "believes that the *EPROMs* factors weigh against a downstream products remedy" due to "the limited evidence regarding downstream use of the infringing products as to the '258 patent," and

since the vast majority of record evidence relied on by Linear and the IA concerns "the use of AATI charge pump products accused of infringing the '531 patent" and evidence with regard to the voltage regulator products accused of infringing the '258 patent "is limited and lacking in specificity." IA Review Brief 36.

The IA argues that the principal remedy issue concerning downstream products "does not hinge directly on the differing applications of the so-called '*EPROMs* factors,' but instead involves a more fundamental concern, namely the limited evidence of specific imported downstream products containing the infringing voltage regulators." IA Review Reply Brief 23. The IA argues that Linear's requested remedy is too broad, and that although "Linear has identified AATI's top customers, described AATI's sales practices, and identified certain categories of products that use switching voltage regulators" (IA Review Reply Brief 23-24), Linear "fails to specifically link any particular types of downstream products to the infringing AATI parts." IA Review Reply Brief 24.

The IA argues that a cease and desist order is inappropriate based on "the absence of evidence of a commercially significant inventory of infringing products in the United States." IA Review Brief 37; *see also* IA Review Reply Brief 25.

Regarding the public interest, the IA finds that the entry of a limited exclusion order covering AATI's infringing voltage regulators is not contrary to the public interest since there is no indication that Linear or other licensed entities will be unable to satisfy the market's demands in the foreseeable future for voltage regulators, since voltage regulators do not appear to be products which have significant public health or welfare implications. IA Review Brief 37-38.

Regarding bonding, the IA argues that based on the evidence of record "it is unclear whether a 40% bond would make Linear whole in the event AATI continued to import infringing products during the Presidential review period," and recommends a 100 percent bond. IA Review Reply Brief 26. The IA also argues that the evidence does not allow precise calculations as to price differentials. IA Review Reply Brief 26.

Determination

1. Remedy

In our view, a limited exclusion order is the appropriate remedy for the violation we have found. However, because there is not sufficient evidence as to the importation of downstream products containing voltage regulators infringing the '258 patent, either by AATI or third parties, we agree with the IA and do not include downstream products in the remedy.

Specifically, we note that, absent sufficient evidence concerning downstream products containing the infringing components, the Commission has declined to provide a downstream products remedy. *See High-Brightness LEDs and Products Containing Same*, Inv. No. 337-TA-556, Comm'n Op. 27-28 (May 31, 2007) (applying *EPROMs* factors analysis to first level intermediate downstream products such as packaged LEDs, and declining to apply *EPROMs* factors analysis to second level downstream products such as mobile phones due to a lack of evidence that the second level downstream products containing the infringing LEDs actually enter the U.S.); *Certain Audio Digital-to-Analog Converters and Products Containing Same*, Inv. No. 337-TA-499, Comm'n Op. at 21-22 (declining to extend an exclusion order to cover downstream products,

absent evidence that a significant volume of imported products actually contained the infringing component; "the Commission will not simply assume the existence of such imports").

In this case, Linear's evidence relates almost exclusively to the '531 patent. Thus, in our view Linear has not pointed to substantial evidence showing that AATI or third parties have actually imported downstream products infringing claims 2, 3, and 34 of the '258 patent into the United States.

Because Linear has not provided sufficient evidence of importation of downstream products containing articles infringing the sleep mode claims of the '258 patent, we are unable to conduct an analysis of the *EPROMs* factors.

More specifically, although Linear argues that AATI

and alleges sales in excess of

(Linear Review Reply Brief 23; Linear Remedy Reply Brief 7-8, 8 at footnote 4), we note that Linear fails to show significant evidence of importation of the

(although the is in the AAT1143 respective group and allegedly corresponds to the AAT1143). *See* CX-82C (Joint Stipulation Regarding Selection of Representative Accused AATI Products Based on Structure and Operation of Respective Circuitry) (showing that is in the group represented by AAT1143). In other words, although Linear may have demonstrated that the products incorporate the (*see* CX-283C at AATI0046303) and AATI made sales of the for the

(*see* CX-466C at AATI0046984), Linear

has not shown that a member of the group represented by the AAT1143, here the , was incorporated into a downstream product which was actually and significantly imported into the United States.

Although Linear has demonstrated use of the AAT1143 in (Linear Review Reply Brief 23; *see also* CX-433C at 49906-07), Linear has not sufficiently demonstrated that the have actually been imported into the United States. The statement relied upon by Linear to supposedly show importation is the testimony of Mr. Williams, AATI's CEO, stating "that AATI sells to and 'some of those models come into the United States.'" Linear Remedy Reply Brief 8 (citing Williams Tr. 1238:12-1239:3). However, our review of the cited transcript reveals this testimony to be inconclusive as to whether the models Mr. Williams refers to as coming into the United States are actually the that contain the accused AAT1143 product, or other non-infringing models.

We are likewise not persuaded by Linear's arguments that "AATI's sales representative, Mr. Nah, testified that " (Linear Remedy Reply Brief 8), since Mr. Nah did not specify whether the accused devices he was testifying about were from the groups representative of the products accused of infringing the '531 patent or from the groups representative of the products accused of infringing the '258 patent. Accordingly, it is our view that Mr. Nah's testimony is not conclusive as to

which contained voltage regulators infringing the sleep mode claims of the '258 patent.

We agree with the IA that *Baseband Processor Chips* does not indicate the Commission's endorsement of "full downstream relief" in the absence of evidence of actual downstream imports. IA Review Reply Brief 25. To the contrary, since it appears that the significant portion of the downstream products imported include charge pumps which are covered by the '531 patent, and the Commission has determined that there is no violation of section 337 with respect to the '531 patent, we agree with the IA that Linear's evidence to support downstream product exclusion is insufficient. IA Review Reply Brief 23-25. Thus, we agree with the IA that "the vast majority of the downstream product evidence relied upon by Linear and OUII concerned the use of AATI charge pump products accused of infringing the '531 patent," and "[i]n comparison, with regard to the switching regulator products accused of infringing the '258 patent, evidence concerning the downstream use of these products is limited and lacking in specificity." IA Review Brief 36. Linear simply has not shown enough evidence that actual downstream products imported into the U.S. include AATI's infringing voltage regulators, and therefore should be excluded.[4]

With respect to Linear's request for a cease and desist order, although Linear may be correct that AATI keeps some inventory of infringing voltage regulators in its

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[4] We note that LG has argued that Linear (*see* Linear Review Brief 9) appears to have mischaracterized Mr. Kim's testimony (LG's witness) as stating that the cell phone used an AATI voltage regulator (of the '258 patent) and not the charge pump (of the '531 patent). LG Remedy Reply Brief 4-6. We find no evidence that contradicts LG's argument on this issue.

Sunnyvale, California facilities, we agree with the ALJ's conclusion that AATI's domestic inventory of infringing, imported products is not "commercially significant" (*see* Linear Remedy Reply Brief 22; *see also* RD 6-7). We thus agree with AATI that Linear has not met its burden of proving the AATI has a "commercially significant" inventory of infringing products in the United States as required by *Baseband Processor Chips*.

Accordingly, we determine to issue a limited exclusion order covering only AATI infringing voltage regulators and no downstream products, and determine not to issue a cease and desist order.

2. Public Interest

When issuing an exclusion order under section 337(d), the Commission must weigh the remedy sought against the effect such a remedy would have on the following public interest factors: (1) the public health and welfare; (2) the competitive conditions in the United States economy; (3) the production of articles in the United States that are like or directly competitive with those subject to the investigation; and (4) United States consumers. *See* 19 U.S.C. § 1337(d)(1).

We agree with the IA and Linear that no public interest concerns will be raised by issuing a limited exclusion order directed to infringing voltage regulators produced by AATI. Linear Remedy Brief 18-19, Linear Remedy Reply Brief 22-23. The IA is correct that viable non-infringing alternatives exist and there is no evidence that Linear cannot meet the demand for voltage regulators. Both of these circumstances obviate any public interest concerns. Thus, we believe that excluding AATI's infringing voltage regulators

will not harm the public health and welfare, nor will it harm United States consumers. Linear Remedy Brief 18-19. In addition, the market will be supported by non-infringing alternatives. Linear Remedy Brief 19. Accordingly, we determine that the statutory public interest factors do not preclude issuance of the proposed limited exclusion order.

3. Bonding

Section 337(j) provides for entry of infringing articles during the sixty (60) day period of Presidential review upon posting of a bond and states that the bond is to be set at a level "sufficient to protect the complainant from any injury." 19 U.S.C. § 1337(j)(3); *see also* 19 C.F.R. § 210.50(a)(3).

Commission precedent allows for a 100 percent bond when it is not practical or possible to set the bond based on price differential. *See Certain Flash Memory Circuits and Products Containing Same*, Inv. No. 337-TA-382, Comm'n Op. at 26-27 (July 1997) (a 100 percent bond imposed when price comparison was not practical because the parties sold products at different levels of commerce, and the proposed royalty rate appeared to be de minimis and without adequate support in the record). We agree with Linear (Linear Remedy Brief 19, Linear Remedy Reply Brief 23-24) and the ALJ (RD 8) that wide price differentials between Linear and AATI products, lack of clear evidence relating to a reasonable royalty, and the need to insure that Linear is protected from injury weigh in favor of setting the importation bond at 100 percent of entered value. We also agree with the IA that the evidence does not allow precise calculations as to price differentials, and that the evidence generally indicates a price differential "considerably greater than the 30% claimed by AATI." IA Review Reply Brief 26.

Accordingly, we determine that the appropriate amount of bond is 100 percent of the entered value of infringing AATI voltage regulators.

V. CONCLUSION

For the reasons discussed herein, we determine to reverse-in-part the subject ID such that: (i) the ALJ's construction of the terms in claims 2, 3, 34, and 35 of the '258 patent is modified; (ii) the ALJ's conclusions on infringement of the '258 patent are reversed-in-part by reversing the ALJ's finding of no literal infringement with respect to the sleep mode claims (asserted claims 2, 3, and 34) as to representative product AAT1143, affirming the ALJ's finding of no infringement with respect to the reverse current claim (asserted claim 35), and not reaching the ALJ's findings of no indirect infringement with respect to all asserted claims; and (iii) the ALJ's findings of validity of claims 2, 3, and 34 and of invalidity of claim 35 of the '258 patent are affirmed.

Further, we have determined to exclude from entry for consumption into the United States AATI's voltage regulators that infringe one or more of claims 2, 3, and 34 of the '258 patent. The public interest factors found in 19 U.S.C. § 1337(d)(1) do not preclude issuance of this order. The amount of the bond for temporary importation during the Presidential review period is set at one hundred (100) percent of the entered value of the infringing, imported voltage regulators.

By order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: October 19, 2007

CERTAIN VOLTAGE REGULATORS, COMPONENTS THEREOF AND PRODUCTS CONTAINING SAME **337-TA-564**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **COMMISSION OPINION** has been served by hand upon the Commission Investigative Attorney, David Hollander, Esq., and the following parties as indicated, on October 19, 2007.

Marilyn R. Abbott

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